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Bibliography on Climate of Central and West Africa, p. 837

. 3 August, 1952 No. 8

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains from 175 to 300 abstracts of current periodical literature and monographs in the fields of meteorology, hydrology, oceanography, etc. These abstracts are arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of from 50 to 250 important references on a special subject without respect to recency of material. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject. Preference is given to recent material, comprehensive works, material from obscure sources, and items with good bibliographies.

Bibliographies previously published were:

No.	Mo.	Vol. I, 1950	Vol. II, 1951
1.	Jan.	**Atmospheric Pollution**	**Extended Forecasting**
2.	Feb.	**Aerobiology**	**Long Range Forecasting**
3.	March	**Cloud Physics and "Rain Making"**	**Soil Temperature**
4.	April	**Hail**	**Constants, Units, Tables and Diagrams**
5.	May	**Tornadoes**	**Climate of the Near East**
6.	June	**Volcanic Dust**	**Climate of the Middle East**
7.	July	**Climatic Changes**	**Special Winds**
8.	Aug.	**Thunderstorms**	**Radar Storm Detection**
9.	Sept.	**Icing**	**Condensation Trails**
10.	Oct.	**Acoustical Propagation**	**Climate of Northeast Africa**
11.	Nov.	**Evaporation**	**Mountain Meteorology**

Bibliographies published this year were:

1. **Climatology of Northwest Africa,** Vol. III, No. 1, Jan. 1952
2. **Carbon Dioxide,** Vol. III, No. 2, Feb. 1952
3. **Climate of Paraguay, Uruguay and Argentina,** Vol. III, No. 3, March 1952
4. **Dew,** Vol. III, No. 4, April 1952
5. **Objective Forecasting,** Vol. III, No. 5, May 1952
6. **Stratus Forecasting,** Vol. III, No. 6, June 1952
7. **Urban Climatology,** Vol. III, No. 7, July 1952
8. **Climate of Central and West Africa,** Vol. III, No. 8, Aug. 1952

Forthcoming bibliographies will be:

9. **Visibility,** Vol. III, No. 9, Sept. 1952
10. **Glaze and Rime,** Vol. III, No. 10, Oct. 1952
11. **Free Air Turbulence,** Vol. III, No. 11, Nov. 1952

Other bibliographies in preparation are:

Actinometers
Arctic Meteorology
Auroral Physics
Climate and Cancer
Climate of Australasia
Climate of Southeast Asia and the East Indies
Frost and Frost Forecasting
High Level Winds
Machine Methods in Meteorology
Microwave Propagation
Oceanographic Meteorology
Ozone
Tropical Cyclones
Tropopause Variations
Turbulence

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the June and December issues cumulative indexes are published.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society) Library, Milton, Mass.
NN:	New York Public Library, New York, N. Y.
NNA:	American Geographical Society Library, New York, N. Y.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts.

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5–6):146–151, May–June 1950.

This indicates that the article appeared in *Meteorologische Rundschau, Jahrgang* 2 (Vol. 2), *Heft* 5–6 (No. 5 and 6), *pages* 146–151, May–June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

WORKS OF SPECIAL INTEREST

3.8–1 551.508.21 551.521.1

Ångström, Anders (*Dir. Swedish Met. and Hydrolog. Serv.*), **Actinometric measurements.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 50–57. 2 figs., 11 refs., 7 equations.) **MH-BH**—The author discusses accuracy of actinometric measurements, including atmospheric and instrumental factors; determination of solar constant and errors in such determinations; actinometric measurements at ordinary meteorological stations for the purpose of providing micrometeorological, energy exchange, or optical data for biological, agricultural or hydrological investigations. Since such observations need not be as accurate as those for determination of solar constant, a rational network in each service is suggested as comprising one central actinometric observatory for studying problems of ozone variations, astrophysical work, calibration, standardization and checking of secondary instruments against absolute instruments such as the Ångström compensation pyrheliometer. Detailed instrumental and observational program of network of second and third order actinometric stations is also outlined. Comparison of sunshine records at regular meteorological stations or second and third order actinometric stations is suggested. Finally, the author stresses the importance of a thorough knowledge of, and ample data on the variations in the scattering coefficient with latitude, altitude, season and region; and of differentiating between scattering and absorption values in actinometric measurements. Such research and data will be of use to both physical and dynamical meteorologists on the one hand and to biologists on the other, especially where special portions of the spectrum are being considered. *Subject Headings:* **1. Actinometric measurements 2. Solar constant 3. Scattering coefficient.**—*M.R.*

3.8–2 551.509.1

Bellamy, John C., **Models and techniques of synoptic representation.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 711–714. 3 refs., 3 equations.) **DWB**—Present plotting techniques using only part of the data are inadequate for dynamic models of the hydrostatic and gradient wind equations. Suggested improvements are: use of deviations from standard conditions and transmission of all data by direct-writing time and height graphs. *Subject-Heading:* **1. Synoptic diagrams.**—*C.E.P.B.*

3.8–3 551.515.11:551.513.1

†Fjørtoft, R., **Stability properties of large-scale atmospheric disturbances.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 454–463. 3 figs., 27 refs., 40 equations.) **MH-BH, DWB**—An examination of disturbances of cyclonic size in a stable uniform zonal flow, the two components reacting on each other. The results applied to idealized meridional circulation cells give an expression for the time rate of change of vertical wind shear of the mean zonal flow. Disturbances are classified according as their main source of energy is potential, kinetic or both, depending on correlation between potential temperature and vertical velocity. Mathematical requirements of baroclinic disturbances are compared with synoptic experience. Assumptions and results on stability of waves are compared with those of CHARNEY and EADY. Barotropic disturbances involve no wind shear and are treated as transport of vorticity; KUO showed that shortest (below 300 km) and longest waves are stable, medium waves are unstable. Possible investigation of combined baroclinic and barotropic disturbances is briefly considered. *Subject Headings:* **1. Atmospheric circulation 2. Waves in the westerlies.**—*C.E.P.B.*

3.8–4 551.515

Fulks, Joe Robert, **The instability line.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 647–652. 2 figs., 15 refs.) **DWB**—The instability line is a transitory nonfrontal squall line or pseudo cold front and pressure trough, the leading edge of a convective band 30–50 miles wide, 50–300 miles ahead of a cold front. It is shown in plan and section and attributed to cooling above a stable layer. The methods of recognition and physical processes are described. It has an important relation to occurrence of tornadoes. *Subject Headings:* **1. Instability line 2. Tornado forecasting.**—*C.E.P.B.*

3.8–5 551.515:551.510.535

Leithäuser, G., **Über ionosphärische Störungen und deren irdische Auswirkungen.** [On ionospheric disturbances and their terrestrial effects.] *Funk und Ton*, Berlin, 3(3):127–143, **1949.** 9 figs., 14 refs.—Describes normal daily variation of wireless echoes and its disturbances by Mögel-Dellinger solar effect, auroras and meteors, with illustrations. Most important are the new reflection levels due to "inbreak layers" associated with auroras and magnetic disturbances. These have marked effects on wireless transmission. There is also a relation between development of inbreak layers and of low pressure areas at the surface in the auroral region, illustrated by charts Feb. 13–17, 1948 and meteorological observations Feb. 1–March 19. Association of Norwegian anticyclones and cold European winters with solar eruptions is also discussed, including possible ameliorating effect of atom bombs. *Subject Headings:* **1. Ionosphere 2. Atmospheric disturbances.**—*C.E.P.B.*

3.8–6 551.506.7(261)(4) 551.557.35:551.547

§Murray, R. and Johnson, D. H., **Structure of the upper westerlies; a study of the field in the eastern Atlantic and western Europe in September 1950.** *Royal Meteorological Society, Quarterly Journal*, 78(336):186–199, April **1952.** 43 figs., 3 refs. **DWB**—From 60 cross sections of wind up to 150 mb Lagens-Stockholm and Angmagsalik-Malta, in Sept. 1950, it was found that the westerlies always contain one or more centers of maximum velocity (jet streams), most frequently around 275 mb. Horizontal wind shear, shown by velocity profiles at jet stream level, averages 20 kt/100 mi on cold side and $\frac{2}{3}$ this on warm side; vertical wind shear varies. Cross sections of wind agree well with 300 mb contours; daily charts of jet axis are shown related to surface isobars and fronts. *Subject Headings:* **1. Jet stream 2. Upper air winds.**—*C.E.P.B.*

3.8–7 551.511:551.558.29

Panofsky, H. A., **Large-scale vertical velocity and divergence.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 639–646. 5 figs., 26 refs., 11 equations.) **DWB**—Mean vertical velocity over large areas can rarely be measured directly. It can be estimated from horizontal velocity differences normal to sides of a square or triangle but these average 1 m/sec and apparent divergence is inversely proportional to length of side. Other methods include *kinematic* from run of pilot balloons and adiabatic from temperature change of rising or sinking air. Both these give vertical velocities averaging 1 cm/sec. Distribution is set out, showing a minus correlation with pressure changes. Convergence or divergence at tropopause balances that at surface. Discussion includes theoretical explanation, relation to cloud changes and applications to forecasting. *Subject Headings:* **1. Divergence 2. Vertical velocity.**—*C.E.P.B.*

3.8–8 551.501.9:551.513

Spilhaus, Athelstan F., **World weather network.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 705–710. 3 figs., 14 refs.) **DWB**—The most difficult regions in which to secure adequate representation for investigation of atmospheric circulation are oceans far from islands, and polar regions. World maps show lines of equal distance from any land, sea areas with less than 10 observations a year, and a combined map. Various long term and interim measures for filling these gaps are discussed. *Subject Headings:* **1. Observational networks 2. Station locations.**—*C.E.P.B.*

3.8–9 551.513.1

Starr, Victor P., **The physical basis for the general circulation.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 541–550. 18 refs.) **MH-BH, DWB**—An introductory essay. The mean circulation is first treated as a flow of angular momentum from tropical easterlies to middle westerlies, of 50–100 dynes/cm², for which large scale non-zonal components are necessary. Studies of angular momentum balance give adequate results. In 30°N transfer increases up to jet level. There should be a net transport of internal heat energy and therefore of kinetic energy poleward in mid-latitudes, generated in tropics by divergence and consumed near pole by convergence, with local surges in developing cyclones which intensify the latter. There is also a large transport of latent heat. Transport of kinetic energy into Arctic is abnormally large only when the capacity of the polar cap to destroy it is also large; causes of fluctuations are discussed. Much work in progress or required for a fuller understanding is listed. *Subject Headings:* **1. Atmospheric circulation 2. Mechanics of the atmosphere.**—*C.E.P.B.*

3.8–10 551.511

Van Mieghem, Jacques M., **Application of the thermodynamics of open systems to meteorology.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 531–538. 14 refs., 37 equations.) **MH-BH, DWB**—Open systems exchange matter as well as energy with the surrounding medium. The First Law of Thermodynamics is developed to include heat gained e.g., by convection, and the Second Law to entropy production by exchange of matter and energy as well as by internal transformation. Author discusses "pseudoadiabatic" transformations in which the heat received does not alter the internal transformation, and "polythermic" systems in which all phases do not have the same temperature (horizontal mixing, evaporation of falling rain). He discusses nonhomogeneous systems (e.g., turbulent fluid). Equations developed are also stated as laws. Application of these laws to heat flux due to turbulence in the vertical and to the general circulation is discussed. *Subject Heading:* **1. Thermodynamics of the atmosphere.**—*C.E.P.B.*

3.8–11 551.511:551.515:532.5

†Van Mieghem, Jacques M., **Hydrodynamic instability.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 434–453. 46 refs., 92 equations.) **MH-BH, DWB**—Stability of the 'simple motion' on which perturbations are superposed depends on whether roots of its equations are real. In geostrophic motion, a particle is in stable or unstable equilibrium when sum of longitudinal kinetic energy, specific enthalpy and potential energy is a minimum or maximum. In middle and high latitudes hydrodynamic instability can only develop where baroclinicity is marked, i.e. in and near frontal zones. Near equator force acting on a displaced particle is vertical. Considering inertial oscillations of the geostrophic current, it is found that there are two solutions, one giving a short period vertical oscillation and the other long period, associated with the isentropic surface. Hydrodynamic instability is related to cyclogenesis and the theory of pressure perturbations. These results are applied to permanent horizontal isobaric motion, the permanent circular vortex (tropical cyclone), etc. *Subject Headings:* **1. Hydrodynamics 2. Instability.**—*C.E.P.B.*

GENERAL METEOROLOGY

3.8–12 551.5:37(02)

Wilson, James R. (*Phoenix Union High School*) and Hennelly, R. J. (*Phoenix College*), **Meteorology; an elementary textbook.** Phoenix, Arizona, Printery Publishing Co., **1951.** 92 p. 63 figs., biblio. p. 90., glossary p. 87–89. **DWB**—The difficult task of presenting basic general and synoptic meteorological knowledge to the high school or junior college student is to arouse his interest in meteorology and to help him undertake some practical experiments and acquire abilities which will serve him in his future career in meteorology or aviation. Besides a clear explanation of meteorological phenomena illustrated by photos and diagrams, each chapter contains systematic exercises. The student is also introduced to the reading and preparing of weather maps and to interpreting symbols and codes. An extensive

glossary of terms and supplementary chapters on meteorology and aviation, on artificial rain making and on world climatology are included. *Subject Headings:* **1. Meteorology 2. Glossaries 3. Textbooks.**—*G.T.*

3.8–13 551.5(02)(26)

†§Donn, William L., **Meteorology with marine applications.** 2nd rev. ed. New York, McGraw-Hill, **1951.** 465 p. numerous figs., table, refs. **DWB**—The chief revision which appears in the 2nd ed. is the rewriting of Chap. 12 which contains the 1949 IMO Marine Code in great detail, and a sample of the Weather Bureau's new form for recording ships' observations in this code. Station models for synoptic charts and other revisions up to Aug. 1950 are also included. The remainder of the book is much the same as the first edition (*see item* 2.2–4 in Feb. 1951 *Meteorological Abstracts*), with emphasis on modern concepts of synoptic meteorology, air masses and fronts, and considerable space devoted to oceanographic aspects and marine climates. *Subject Headings:* **1. Marine meteorology 2. I.M.O. Marine Code 3. Weather ships 4. Textbooks.**—*M.R.*

3.8–14 551.5:551.46(261/4)

*Schott, Gerhard, **Geographie des Atlantischen Ozeans.** [Geography of the Atlantic Ocean.] 3rd ed. Hamburg, C. Boysen, **1944.** 438 p. 141 figs., 27 color plates, refs. **DLC**—According to the author, this third and latest edition is a "new book" almost completely rewritten and vastly improved over earlier editions by the inclusion of charts based on data from the "Meteor" (1925–27) and other oceanographic expeditions. This edition is modeled after his "Geography of the Indian and Pacific Oceans" (1935). One of the author's prime aims is to show the dynamic interrelation between ocean and atmosphere. A new section containing aerological data up to 4000 m above the sea surface has been added to the chapter (VI) entitled "Chief characteristics of the atmosphere over the Atlantic Ocean." Lengthy, well-illustrated chapters on the history, physical and human geography, geology, climatology and marine biology of the Atlantic combine to make SCHOTT's work a monumental and comprehensive regional study. *Subject Headings:* **1. Marine meteorology 2. Oceanography 3. Oceanic climates 4. Textbooks 5. Atlantic Ocean.**—*M.P.K.*

3.8–15 551.5:551.463

Frank, Hans, **Wettererfahrungen in der westlichen Ostsee.** [Weather experiences in the western Baltic.] *Wetterlotse*, No. 26/27:1–16, Aug. **1951.** 6 figs. **DWB**—Description by a sailor of long experience of peculiarities of Baltic weather. From March to mid-July (cold water period) sea is colder than air, with good weather and steady laminar air flow decreasing to calm at sea surface, marked sea breezes on coast, poor visibility and mirages. In mid-July to Dec. or Jan. (warm water period) conditions are reversed. Some interesting air circulations and cloud systems are shown by sketches. A succession of small depressions brings the hot thundery "dog-days" in the German interior in summer. *Subject Headings:* **1. Weather 2. Baltic.**—*C.E.P.B.*

3.8–16 551.5:614.8

Great Britain. Ministry of Civil Aviation, **Civil aircraft accident. Report of the Court investigation on the accident to Viking G-AHPN on 31st October, 1950.** London, H.M. Stationery Office, **1951.** 13 p. fig. M.C.A.P. 95. **GB-MO**—The aircraft struck a runway at London Airport in thick fog. Causes are examined and recommendations made. *Subject Headings:* **1. Fog 2. Aircraft accidents.**—*C.E.P.B.*

3.8–17 551.5:629.13

Ludlam, F. H., **Jets and jolts.** *Weather*, 7(3):90–92, March **1952. DWB**—Account of a discussion on "Meteorology and the operation of jet aircraft" at Institution of Electrical Engineers, Feb. 20, 1952. *Subject Headings:* **1. Aeronautical meteorology 2. Jet aircraft.**

3.8–18 551.5:629.13:001(02)

McCuistion, A. L., **Elementary weather for pilots.** Oklahoma City, Bonney, **1942.** 147 p. graphs, diagrs., tables. Price $1.50. **DWB**—Definition and explanation of synoptic

elements and basic weather phenomena are given and illustrated on explanatory diagrams and charts. Photos of clouds and meteorological instruments are presented, and symbols and codes used on weather maps and in weather reports and teletype communications are listed. The last section contains a summary arranged in 300 questions and answers. A glossary of 87 basic terms and their brief definitions is attached. *Subject Headings:* **1. Elementary meteorology 2. Aeronautical meteorology 3. Definitions 4. Textbooks.**—*G.T.*

3.8–19 551.5:629.13

Robin, Ben, **Don't 'but' the weather.** *Flying*, New York, 46(3):34, 48, 50, March **1950. DLC**—A popular article giving practical hints to the lightplane pilot for making use of information furnished by the Weather Bureau on storms, ceilings, icing, gusts, etc. *Subject Heading:* **1. Aeronautical meteorology.**—*M.R.*

3.8–20 551.5:63(09)

Sanson, J., **Un siècle d'enseignement de la météorologie agricole en France (1848–1948).** [A century of teaching agricultural meteorology in France (1848–1948).] *La Météorologie*, 4th Ser., No. 12:278–291, Oct.–Dec. **1948. DWB**—*Subject Headings:* **1. Agricultural meteorology 2. History of meteorology 3. Teaching of meteorology.**

3.8–21 551.5:656.6

Frankcom, C. E. N., **Meteorology in relation to the carriage of goods by sea.** *Marine Observer*, 22(156):75–81, April **1952.** fig. **DWB**—Discusses effect of weather on conditions of cargoes, e.g., grain. Considers sweating and ventilation in extreme cases, hygroscopic cargoes, effect of refrigeration, mechanical ventilation and drying, etc. *Subject Headings:* **1. Marine transport. 2. Moisture damage.**—*C.E.P.B.*

3.8–22 551.5:656.7 551.576.1:779

Chambers, E., **'Comets' and weather.** *Weather*, 7(3):67–72, March **1952.** 4 plates. **DWB**—Describes effect of meteorological conditions on take off, flight and landing of a commercial jet aircraft. Planning requires statistical data on temperatures and winds at airports and along route, and cloud base and visibility for landing; preflight forecasting is also discussed. Eight excellent cloud photos from a 'Comet' are included. To be continued. *Subject Headings:* **1. Airlines meteorological services 2. Cloud photographs 3. Jet aircraft.**—*C.E.P.B.*

3.8–23 551.5:656.7(02)

Eredia, Filippo, **Lezioni di meteorologia e di aerologia.** [Courses in meteorology and aerology.] Rome, S.A. Editrice "Studium Urbis," **1941.** 613 p. diagrs., graphs, tables, equations. Price L.80. **DLC**—One of the best textbooks on aviation meteorology in any language, this large volume goes into detail on all phases of dynamic and synoptic meteorology, including special cloud formations, turbulence, special winds, cloud physics, instruments of all kinds, methods of observation, and, last but not least, an excellent chapter on icing of aircraft under various cloud or orographic conditions. More space is devoted to dynamic meteorology and less to a description of weather reporting facilities and services than is customary in other such texts. *Subject Headings:* **1. Aeronautical meteorology 2. Textbooks. I. Rome. Universita Scuola di Ingegneria Aeronautica.**—*M.R.*

3.8–24 551.5:656.7(02)

U. S. Bureau of Naval Personnel, **Aerology.** Washington, D. C., U. S. Govt. Print. Off., **1944–45.** 2 v. diagrs., photos., tables, graphs. **DLC**—A practical and profusely illustrated textbook for enlisted men in Naval Aviation, with many sample charts, diagrams, forms and nomograms. The first volume has chapters on aerology, temperature, pressure, humidity, precipitation, surface winds, winds aloft, clouds, fog, weather codes, maps, charts, instrument records, aerological reports and records, and the functions of the aerological office. Volume II concerns the atmosphere, general circulation, air masses and fronts, disturbances, icing, synoptic charts, upper air soundings (radio and airplane), adiabatic charts, upper air analysis, forecasting and ocean weather. The chapter on icing is especially good, containing many

practical suggestions regarding flying in icing conditions. *Subject Headings:* **1. Aerology 2. Textbooks 3. Aeronautical meteorology. I. U. S. Navy. Naval Air Technical Training Command II. U. S. Bureau of Naval Personnel. Naval Training Courses.**—*M.R.*

3.8–25 551.5:93

Brunt, Sir David, **A hundred years of meteorology, 1851–1951.** *Advancement of Science*, London, No. 30, Sept. **1951.** 10 p. Abstracted from reprint. **DWB**—In this sketch of the history of meteorology, special attention is paid to its progress in Great Britain. Author begins with stimulus given to meteorological studies by the founding of the Royal Society (1660) and then describes various developments that took place in subsequent centuries such as the cloud studies of Howard, investigations of winds and currents, the founding of the Royal Meteorological Society (1850), the establishment of a Meteorological Weather Service (1855), the history of the Meteorological Office and its role during two world wars and in the post-war period and the position of meteorology as a study at British universities. *Subject Headings:* **1. History of meteorology 2. Progress in meteorology 3. Royal Meteorological Society. I. British Association for the Advancement of Science.**—*I.L.D.*

3.8–26 551.5(02)

Angot, Alfred (*Bur. Cent. Met.; Inst. Nat. Agronomique*), **Traité élémentaire de météorologie.** [Elementary treatise on meteorology.] 5th ed. Paris, Gauthier-Villars, **1944.** 420 p. 119 figs., numerous refs. **DWB**—This excellent textbook is "elementary" only in respect to the lack of detailed mathematical, historical or tabular material or derivations. It covers very thoroughly, and on an academic level, all of the important aspects of dynamic and synoptic as well as descriptive meteorology. The original text, and the second and third editions were prepared and revised by A. ANGOT in the years from 1900–1917, and has again been revised to some extent, and four chapters added: one on actinometry and solar radiation, one on aerology (vertical distribution of temperature, moisture and wind, turbulence, etc.), one on air mass analysis (BJERKNES school), and one on modern practical forecasting techniques (previous to World War II). The chapter on the general circulation has been revised and shortened. Other chapters cover statistical methods, air temperature, soil and water temperature, pressure, wind, evaporation and humidity, clouds and fog, rain, hail, dew, frost and ice; optical phenomena, cyclones, thunderstorms, tornadoes, and cosmic influences. *Subject Headings:* **1. Meteorology 2. Textbooks. I. Brazier, C.-E.** (*ed.*).—*M.R.*

3.8–27 551.5(02)

Flechtner, Hans-Joachim, **Tú y el tiempo.** [You and the weather.] 3rd ed. Price: $5.00. Barcelona, Editorial Labor, S.A., **1950.** 407 p. 207 figs., 16 photos. Translation by Julio Gadea and Manuel Álvarez Castrillón of "Du und das Wetter." **DWB**—This is the second reprinting of a translation from the original German which first appeared in Spanish in 1942. Although written for the layman and replete with popular type illustrations and diagrams, the basis of the text is technical and scientific, with emphasis on radiation, atmospheric structure, air masses, fronts, synoptic forecasting, long range forecasting, climatic changes, bioclimatology, artificial climates, etc. The sections on clouds, auroras, thunderstorms, hurricanes and other phenomena are vividly described and illustrated. Probably the best elementary meteorology in Spanish. *Subject Headings:* **1. Meteorology 2. Textbooks 3. Spanish language 4. Translations. I. Gadea, Julio** (*trans.*) **II. Álvarez Castrillón y Bustelo, Manuel** (*trans.*).—*M.R.*

3.8–28 551.5(02)(04)

Kimble, George Herbert Tinley (*Dir. of Amer. Geog. Soc.*), **The weather.** rev. and enl. ed. Harmondsworth, England, Penguin Books, **1951.** 256 p. port., 21 figs. **DLC**—This pocket-sized text on general meteorology from the layman's standpoint, was first published in 1943. It has been brought up to date by the addition of paragraphs on such modern subjects as cloud seeding, radar storm detection, etc. The cloud photographs, which one finds in every such text, are unusually well selected and arranged to show the development of weather

processes, rather than mere samples of cloud types. Of course a great deal of space is devoted to weather lore, and most of the references apply to Great Britain or Canada. The book is, on the whole, very readable and accurate. *Subject Headings:* **1. Popular meteorology 2. Weatherlore 3. Textbooks 4. Great Britain.**—*M.R.*

3.8–29 551.5(02):6 551.58

Maurain, Charles Honoré, **La météorologie et ses applications.** [Meteorology and its applications.] Paris, Flammarion, **1950.** 255 p. 19 figs., refs. **DWB, DLC**—A nontechnical treatise on the history and organization of meteorological services, especially in France, on the general concepts of radiation, temperature, general circulation, water vapor in the atmosphere, weather forecasting and climatology. Many modern applications have been introduced, such as cloud seeding, atmospheric pollution control, radio transmission as affected by meteorological conditions, urban climatology, etc. *Subject Headings:* **1. Applied meteorology 2. Climatology 3. Textbooks.**—*M.R.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

(*See also items:* 3.8–8, –56, –117, –128, –207, –230)

3.8–30 551.501.7:551.507.321

Solov'ev, IU. I., **Pervyĭ nauchnyĭ polet na vozdushnom share.** [The first scientific flight in a balloon.] *Priroda*, Moscow, 40(1):73–75, Jan. **1951. DLC**—Description of the balloon ascent of the academician IA. D. Zakharov in June 1804, for the purpose of determining "at a maximum distance from the earth's surface" the evaporation, increase or decrease of magnetic power, behavior of the magnetic needle, increase or decrease of the heating capacity of sun-rays, etc. The article also contains excerpts from the explorer's personal account of his flight. *Subject Headings:* **1. Upper air observation 2. Balloons 3. History of meteorology. I. Zakharov, IA. D.**—*N.T.Z.*

3.8–31 551.501.7:551.507.362:551.510.5

Vaeth, Joseph Gordon (*O.N.R.*), **200 miles up. The conquest of the upper air.** New York, Ronald Press, **1951.** 207 p. 62 figs., chart on lining papers. **DWB**—A profusely illustrated, nontechnical but highly accurate account of the development and operation of many modern devices for exploring the upper atmosphere. The highest flight yet made (to 250 miles) was by means of a WAC Corporal (rocket) fired from a V-2 rocket. Other rockets such as the Aerobee which averages 60–80 miles height, details of instrumentation for measuring pressure, temperature, cosmic radiation, composition of atmosphere, ionization, magnetic field, spectral intensities and biological conditions are described and illustrated. A general review of present day knowledge of physical, chemical and biological characteristics of the upper atmosphere is included. Other interesting chapters describe the use of "skyhook" balloons, the proving grounds at White Sands, N. Mex., the launching and recovery of rockets, etc. *Subject Headings:* **1. Upper atmosphere research 2. Rocket instrumentation 3. Rocket soundings 4. Skyhook balloons 5. Aerobee rockets 6. White Sands, New Mexico.**—*M.R.*

3.8–32 551.501.8:551.508.85

Kennedy, George, **Airport radar eye spots storms as well as planes.** *The Evening Star*, Washington, D. C., September 10, **1951.** 2 photos. **DLC**—Radar equipment at Washington National Airport, which according to author "is believed to be the most powerful radar apparatus used in Weather Bureau forecasting," is described and illustrated. A few details of radar precipitation forecasting are discussed in a popular manner and an example of the use of radar in conjunction with a thunderstorm is given. *Subject Headings:* **1. Radar storm detection 2. Radar equipment 3. Precipitation forecasting 4. Washington National Airport.** —*G.T.*

3.8–33 551.501.8

Mironovitch, V., **Radiographie des sytèmes nuageux par le radar.** [Radiography of cloud formations by radar.] *La Météorologie*, 4th Ser., No. 10:153–156, April–June **1948.** 17 figs., 5 refs. **DWB**—A summary of the uses made of radar for observations of storms, hurricanes and cloud formations, based in general on experience in America. Many excellent PPI scope photographs are reproduced. *Subject Headings:* **1. Cloud observation 2. Radar storm detection 3. Radar photographs.**—*M.R.*

3.8–34 551.501.81:551.577

Kerker, M., Langleben, P. and Gunn, K. L. S., **Scattering of microwaves by a melting spherical ice particle.** *Journal of Meteorology*, 8(6):424, Dec. **1951.** fig., 2 refs. **MH-BH**—Back scattering of 10 cm radar from a melting ice sphere of radius 0.2 cm is calculated by theory of ADEN and KERKER. Results show a rapid increase during early stages of melting. *Subject Heading:* **1. Radar precipitation echoes.**—*C.E.P.B.*

3.8–35 551.501.81:551.578.1(44)

Lhermitte, Roger, **Sur le déplacement anormal de certains échos de pluie.** [On the abnormal displacement of certain rain echoes.] *Académie des Sciences, Paris, Comptes Rendus*, 233(20):1210–1212, **1951.** fig., table. **DWB**—Periodic photographs of the radar screen during passage of storms, when projected rapidly with a movie camera, showed abnormal movement of certain rain echoes when compared with the movement of the general rainfall area or with general upper air winds measured during balloon ascents at Trappes. However, the latter confirm a slight rotation in the cloud base and nonstable flow above 1 or 2 km. Normal and abnormal propagation of echoes and related wind aloft data are tabulated for 3 storms in May and June, 1951. *Subject Headings:* **1. Radar observation 2. Rainfall area movements 3. Upper air wind data 4. Trappes, France.**—*M.R.*

3.8–36 551.501.83:551.594.21:551.594.7(09)(47)

Bazikaĭlo, V. A., **A. S. Popov osnovopolozhnik sovremennoĭ radiometeorologii.** [A. S. Popov—the originator of modern radio meteorology.] *Priroda*, Moscow, 40(11):70–72, Nov. **1951.** 6 refs. **DLC** In 1895 A. S. POPOV exhibited a device capable of detecting thunderstorms within a radius of 40 km, recorded processes leading to the formation of cumulus clouds and, in general, electrical disturbances in the atmosphere. The article describes POPOV's activities in the field of radio meteorology and lists his papers in this field. *Subject Headings:* **1. Radio meteorology 2. Radar storm detection 3. Atmospheric electricity 4. Sferics 5. History of meteorology 6. Popov, A. S. 7. U.S.S.R.**—*I.L.D.*

3.8–37 551.501.9:551.509.3

Belinskiĭ, N. A. and Istochin, IU. V., **Trebovaniia k postanovke gidrometeorologicheskikh nabliudeniĭ v more.** [Requirements for the establishment of hydrometeorological observations at sea.] *Meteorologiia i Gidrologiia*, No. 1:61–64, Sept. **1950.** **DLC** More complete and regular hydrometeorological observations at sea are needed for good marine forecasting service. It is very important to have observations during the whole year, not only in summer. It is necessary also to carry out systematic investigations of sea currents and sea swell, the propagation of tidal profiles and instrumental observations of the ice regime. All the results of these observations should be collected by one institution; the Hydrometeorological Service. *Subject Headings:* **1. Marine observational networks 2. Marine forecasting services.** - *N.T.Z.*

3.8–38 551.501.9(09)

Glebov, P. A., **Istoricheskiĭ ocherk.** [Historical note.] Sverdlovskaia Magnitnaia i Meteorologicheskaia Observatoriia, 1836–1936, IUbileĭnyĭ Sbornik, **1936.** p. 7–94. **DLC**—Outline of the history of the Magnetic and Meteorological Observatory of Sverdlovsk (Ekaterinburg) written for the anniversary publication in commemoration of the centennial of the observatory. The paper consists of an introduction (development of magnetic and meteorological studies prior to the XIX century), 6 chapters and a conclusion. Chap. I deals with the organization of magnetic and meteorological observatories in Russia and activity of the

Sverdlovsk Observatory during the first 50 years; Chap. 2 takes up the activity of the Sverdlovsk Observatory during the last 50 years; Chap. 3 deals with the work done by the meteorological section; Chap. 4 with the activity of the magnetic section; Chap. 5 is a seismic survey in the Ural Area and Chap. 6 describes the hydrological work in the Ural Area (with a table of the hydrometric network in the territory of the former Ural Area). Several papers on actinometric, magnetic, aerological or agrometeorological subjects by the following contributors are included: G. F. Abel's, M. A. Lipina, P. A. Glebov, V. G. Pozdeev, I. M. Bushev, V. A. Batmanov and A. K. Zhikin. These are abstracted separately. *Subject Headings:* **1. Meteorological observatories 2. History of meteorology 3. Sverdlovsk Observatory 4. U.S.S.R.**—*C.K.*

OBSERVATIONAL DATA

(*See also items:* 3.8–6, –112, –149, –163, –174)

3.8–39 551.506:551.577(728.4,

Flanagan, Jeff E.; Escobar M., Carlos; Padilla C., Betty and Dheming, Margarita de) **Recopilación preliminar de datos sobre precipitación pluvial en El Salvador.** [Preliminary summary of data on rainfall in El Salvador.] *El Salvador. Centro Nacional de Agronomía, Santa Tecla, Publicación Especial*, No. 1, Sept. **1951.** 29 p. all tables. **DWB**—Tables of monthly and annual rainfall in inches for entire period of record for 36 stations in El Salvador (arranged alphabetically from Acajutla to Zacatecoluca). The longest record cited is that for San Salvador (1912–1950). Elevation of stations not given. *Subject Headings:* **1. Precipitation data 2. El Salvador.**—*M.R.*

3.8–40 551.506.1 551.582.3(266)

*Great Britain. Meteorological Office. **Monthly meteorological charts of the Eastern Pacific Ocean, prepared in the Marine Branch of the Meteorological Office.** *Great Britain. Meteorological Office, M.O.* 518 (formerly M.O.M. 446), **1950.** 122 p. all charts. Price: £ 4.4s. **DWB**—Compiled from a combination of Navy observations and those recorded by the Corps of Voluntary Marine Observers in British merchant ships, these charts comprise an excellent monthly coverage of winds, weather, cloudiness, temperature, lightning and tropical cyclones for the eastern Pacific Ocean. The charts are a continuation of a similar series prepared for the western Pacific Ocean. *Subject Headings:* **1. Marine atlases 2. Monthly weather charts 3. Climate of eastern Pacific Ocean 4. Eastern Pacific Ocean.**—*M.P.K.*

3.8–41 551.506.1 551.582.3(694/8)

*Great Britain. Meteorological Office. **Monthly meteorological charts of the Indian Ocean, prepared in the Marine Branch of the Meteorological Office.** *Great Britain. Meteorological Office, M.O.* 519 (formerly M.O.M. 470), **1949.** 98 p. all charts. Price: £ 3,3s. **DLC**—This series of charts, like those for the Western Atlantic and the Atlantic were compiled from almost 100 years of data from the Navy and from the Corps of Voluntary Marine Observers in British merchant ships. Winds, swell, temperature, weather, precipitation and cloudiness charts show means, extremes and percentage frequencies of the various factors. *Subject Headings:* **1. Marine atlases 2. Monthly weather charts 3. Climate of Indian Ocean 4. Indian Ocean.**—*M.P.K.*

3.8–42 551.506.1(485)

*Uppsala. Universitet. Meteorologiska Observatoriet, **Bulletin mensuel, v. 82, 1950.** [Monthly bulletin, v. 82, 1950.] Uppsala, **1951.** 74 p. all tables. In French **MH-BH**—Monthly and annual summaries and summaries of observational data for each day of the year are given, along with hourly pressure, temperature, humidity, wind, and bi-hourly cloud data, and remarks on weather and hydrometeors. Hourly cloud, pressure, temperature, humidity and wind data are also summarized for the year and by seasons. Frequency of winds from 16 directions are shown by seasons. *Subject Headings:* **1. Observational data 2. Climatic data 3. Annual reports 4. Uppsala, Sweden. I. Köhler, Hilding.**—*M.R.*

3.8–43 551.506.5:551.547.1:551.311.17

Brockamp, B., **Die barometrische Höhenberechnung auf der Deutschen Grönland-expedition A. Wegener; Oberflächenform des Inlandeises und des Felsuntergrundes.** [Barometric height calculation in A. Wegener's German Greenland expedition; surface form of the inland ice and of the rock bottom.] *Neues Jahrbuch für Geologie und Paläontologie, Monatshefte*, No. 2:53–55, **1951.**—A discussion of contours and temperature of inland ice surface, thickness and temperature of firn and ice. *Subject Headings:* **1. Inland ice temperatures 2. Arctic expeditions 3. Greenland.**—*C.E.P.B.*

3.8–44 551.506.5

Haynes, B. C., **U. S. Navy's Antarctic Expedition.** U. S. Weather Bureau, May 12, **1947.** Typescript. (A travel report submitted to the Chief of the U. S. Weather Bureau.) **DWB**—Extracts from the daily diary kept by Mr. HAYNES between Nov. 30, 1946 and April 30, 1947, during which the author travelled from Washington, D. C. to Little America (arrived Jan. 15, 1947; departed Feb. 23, 1947) and back by way of New Zealand. The report contains interesting details of operation Highjump, but no tabular data. *Subject Heading:* **1. Antarctic expeditions.**—*M.R.*

3.8–45 551.506.5

Hutchins, P. F. **British scientific work in Spitsbergen.** *Endeavour*, London, 11(41):17–21, Jan. **1952.** 5 figs., 6 refs. **DWB**—British scientific expeditions to Spitsbergen from 1773 to the present are reviewed and their objectives and brief histories given. Ecological studies are mentioned in connection with the 1921, 1923 and 1924 expeditions from Oxford, organized by GEORGE BINNEY. Several expeditions were concerned with glaciological studies. A map of Spitsbergen and color photos showing geological aspects are presented. *Subject Headings:* **1. Expeditions 2. Spitsbergen.**—*G.T.*

3.8–46 551.506.5(988)

Knuth, Count Eigil, **The Danish expedition to Peary Land, 1947–49.** *Geographical Journal*, London 118(1):1–9, March **1952.** map, 7 photos. Discussion p. 9–11. **DWB**—Account of an expedition maintained by air on Brønlund Fjord in N. Greenland. References to high-arctic climate, föhn wind, temperature (minimum −44°C on Feb. 28, 1950). *Subject Headings:* **1. Arctic expeditions 2. Peary Land, Greenland.**—*C.E.P.B.*

3.8–47 551.506.5

Viaut, André, **L'Expédition antarctique française de 1948–49.** [The French Antarctic Expedition of 1948–1949.] *La Météorologie*, 4th Ser., No. 10:157–161, April–June **1948.** 3 figs., photo. **DWB**—Brief illustrated article outlines the main projects undertaken by the French "Commandant Charcot" expedition and the establishment of a meteorological station on Adélie Land (which made surface synoptic and radiosonde observations regularly). Two charts show antarctic regions in detail. Reference is made to other expeditions since 1819. *Subject Headings:* **1. Antarctic expeditions 2. Meteorological stations 3. Commandant Charcot Cruise.**—*M.R.*

INSTRUMENTS

(*See also items:* 3.8–30 to –32, –55, –125, –142, –155, –165, –193, –207, –219)

3.8–48 551.508.26

Tilvis, Erkki, **The gas thermometer of the Institute of Meteorology, University of Helsinki.** *Helsinki. University. Meteorologian laitos, Mitteilungen* No. 68, **1951.** 14 p. 7 figs., 4 refs., 11 equations. **DWB**—At the request of PROF. V. VÄISÄLÄ, a gas thermometer was constructed in the laboratory of the Institute of Meteorology at the University of Helsinki to be used as a standard for calibration of the Väisälä radiosonde. The requirements were that the thermometer be able to measure temperatures from +40°C to −80°C with an accuracy of 0.1°C. These requirements were satisfied with the instrument whose construction and operation are described and illustrated in detail herein. During one trial the mean error from −85°C to +45°C ranged from −.013° to −.022°C. *Subject Headings:* **1. Thermometers**

2. Radiosonde calibration 3. Väisälä radiosonde 4. Gas thermometers. I. Helsinki. University. Institute of Meteorology.—*M.R.*

3.8–49 551.508.43:550.34

Koshcheev, S. M., **O registratsii zemliatriaseniĭ na metstantsiiakh.** [On the recording of earthquakes at meteorological stations.] *Meteorologiia i Gidrologiia*, No. 2:53–54, Oct. **1950. DLC**—The earthquake on August 30, 1949 was recorded by a barograph at the meteorological station at Nikitskiĭ Sad (8 km from Yalta) in Crimea. The author proposes to increase the sensitivity of the barograph for recording earthquakes by meteorological stations. *Subject Headings:* **1. Barographs 2. Earthquakes 3. Crimea, U.S.S.R.**—*N.T.Z.*

3.8–50 551.508.53/4

Langlo, K. (*Oslo*), **Anemometers for the Norwegian-British-Swedish Antarctic Expedition, 1949–52.** *Journal of Scfentific Instruments*, London, 29(2):60, Feb. **1952. DWB**—A detailed drawing of the contact anemometer is presented and explained. The instrument was supplied by the instrument branch of the Norwegian Meteorological Institute and was found in tests in the Arctic to be durable under severe conditions similar to those encountered in the Antarctic (100 knot gales at −50°C, blizzards and icing). *Subject Headings:* **1. Anemometers 2. Antarctic expeditions.**—*G.T.*

3.8–51 551.508.72

Burgos, Juan J., **Nota adicional a "El evapotranspirómetro de Thornthwaite."** [Additional note on "Thornthwaite's evapotranspirometer."] *Meteoros*, Buenos Aires, 1(2–3):223–224, June **1951. DWB**—Brief comments on the application of Thornthwaite's evapotranspirometer (*Ser. Agrometeorológica, Publ.* No. 2, Buenos Aires, 1950), at Seabrook, New Jersey, and in the Argentine. *Subject Headings:* **1. Evapotranspirometers 2. Agricultural meteorology. I. Thornthwaite, Charles Warren.**—*M.R.*

3.8–52 551.508.72:551.573

Mather, John R., **Design and evaluation of a modified evapotranspirometer.** *Johns Hopkins University. Laboratory of Climatology, Seabrook, N. J. Interim Report* No. 15:11–15, Sept. **1951.** fig., 4 tables, 3 ref. **DWB**—Description of a simple, inexpensive method of directly measuring evapotranspiration is given. The potential evapotranspiration depends on the soil moisture content. *Subject Heading:* **1. Evapotranspirometers.**—*A.A.*

3.8–53 551.508.91:551.574.1

Thams, J. C. and Wieland, W. (*Locarno-Monti, Switzerland*), **Die Wirbelbildung im kleinen Scholzschen Kondensationskernzähler.** [The formation of vortexes in a small Scholz condensation nuclei counter.] *Geofisica Pura e Applicata*, 20:138–156, July–Dec. **1951.** 10 figs., 4 tables, 12 refs. In German; English, German and Italian summaries p. 138. **MH-BH**—The results of measurements made on the ruled plates of a Scholz nuclei counter under varying conditions of speed of expansion (which change the strength of the vortex in the apparatus) are presented. The equipment is illustrated photographically and diagrammatically; methods of measurement and calibration described; accuracy shown on a graph; microphotographs reproduced; methods of fixation described; and data presented to show effect of nuclei density, size, speed of expansion, use of the stirrer and other factors on nuclei count. *Subject Headings:* **1. Nuclei counters 2. Condensation nuclei density 3. Scholz nuclei counter.**—*M.R.*

3.8–54 551.508.72

Zakrent, Stefan, **Pomiary parowania ze swobodnej powierzchni wody.** [Measurement of evaporation from open water surfaces.] *Gazeta Obserwatora PIHM*, Warsaw, 3(10):10–14, Oct. **1950.** 9 figs., equations. **DLC**—A description of the construction and operation of different kinds of evaporimeters used for measuring evaporation from open water surfaces subjected to the influence of other meteorological factors, including the usual type of floating evaporimeters, S. K. Banerji and H. M. Wadia's self-registering floating evaporimeter and Bindeman's and Shuleĭkin's evaporimeters. The various types of instruments and the

records obtained from them are illustrated. *Subject Headings*: **1. Evaporimeters 2. Evaporation measurements.**—*A.M.P.*

3.8–55 551.508.77:621.398

Doremus, John A., **Telemetering system for radioactive snow gage.** *Electronics*, Albany, 24(2):88–91, Feb. **1951.** photos, diagr., graph, refs. **DLC**—Report on a snow gage developed during the last two years by representatives of the U. S. Weather Bureau and U. S. Army Corps of Engineers. The instrument measures snowfall in isolated mountain areas in terms of radiation between a slug of Cobalt-60 embedded in the ground and a Geiger-Müller tube suspended above it. Unattended one-way FM radios transmit data to repeaters which forward them to a central recording station. Equipment is described in detail and shown in photographs. Reference is made to working methods involved and to prospects for future development. *Subject Headings:* **1. Snow gages 2. Radioactive snow gages 3. Telemetering systems 4. Automatic weather stations.**—*G.T.*

3.8–56 551.508.77:551.501.9

U. S. Weather Bureau, **Instructions for the operation and maintenance of storage precipitation gages.** Washington, D. C., **1951.** 20 p. forms. **DWB**—A manual for U. S. Weather Bureau stations. The 8″, the Sacramento type and the standpipe storage precipitation gages for measurements in remote areas are described in detail. Instructions for installation of windshields and choice of site are given. Use of aqueous solution of $CaCl_2$ as antifreeze device, an oil cover for reducing evaporation and measurements by scales calibrated in inches are indicated as developments. Practical suggestions, diagrams of equipment, tables for the evaluation of measurements and sample recordings are given, presenting comprehensive information, readily applicable. *Subject Headings:* **1. Precipitation instruments 2. Storage precipitation gages 3. Observers manuals.**—*G.T.*

3.8–57 551.508.822(439.1)

Béll, Béla, **Rádiószonda-felszállások Magyarországon.** [Radiosondes in Hungary.] *Időjárás*, 54(1-2):1-8, Jan.–Feb. **1950.** 3 figs., 7 refs. French summary p. 61. **MH-BH**—The Väisälä radiosonde is described and shown in photographs, its operation explained and the importance of upper air data obtained through its use outlined. An example of a radiosonde ascent is given and results represented in a graph. It is pointed out that a regular schedule of radiosonde ascents has been established recently in Hungary under sponsorship of the Hungarian Ministry of Communications. *Subject Headings:* **1. Radiosondes 2. Väisälä radiosonde 3. Hungary.**—*G.T.*

3.8–58 551.508.822

Müller, Hans, **Die internationalen Radiosonde-Vergleichsaufstiege in Payerne (Schweiz) vom 8. bis 30. V. 1950.** [The international radiosonde comparison ascents at Payerne (Switzerland), May 8–30, 1950.] *Germany. Deutscher Wetterdienst in der US-Zone, Mitteilungen*, Bad Kissingen, No. 12, Oct. **1951.** 11 p. tables, graphs. **DWB**—The German delegation (U. S. Zone) used the Graw radiosonde, the U. S. A. two types, the U. K. one, the French the Bureau type instrument, Finland the Väisälä radiosonde, the Swiss the Olland type. Each type is described, the results of ascents compared in brief tables giving comparison of height of standard surface, and temperature and pressure lapse rates between surfaces. The U. S. Zone instrument (Graw) proved to give temperatures somewhat lower than the U. S., Finnish and British instruments. *Subject Headings:* **1. Radiosonde comparisons 2. Radiosonde accuracy 3. Payerne, Switzerland.**—*M.R.*

SYNOPTIC ANALYSIS AND FORECASTING

(*See also items:* 3.8–1, –2, –37, –131, –137, –153)

3.8–59 551.509.1:629.13

Merewether, A. F., **The use of weather facimile in airline operations.** *Royal Meteorological Society, Canadian Branch* [*Publications*], 2(6), **1951.** 10 p. Mimeographed. **DWB**—Traces briefly the history of facsimile from 1843, when Alexander Bain (an English physicist)

took out the first patent, to the present. The part played by World War II in the development of fax is emphasized. Numerous advantages of fax to the airlines are discussed at length. Certain disadvantages are pointed out also, but the author notes improvements that can be expected. The last part of the paper deals briefly with different types of weather—fog, icing, thunderstorms, etc. which adversely affect airline operations and the measures being taken to solve the problems they create. *Subject Headings:* **1. Facsimile map transmission 2. Aeronautical meteorology.**—*M.L.R.*

3.8–60 551.509.1(046)

Watson-Watt, Sir Robert, **Forecasting the weather.** *Weather*, 6(9):259–261, Sept. **1951.** Reprinted from: *The Times*, 27 July **1951. DWB**—An account of the "Airmet" broadcasts which ceased in March 1950, their value to the public and the petitions for their resumption. *Subject Headings:* **1. Weather forecasting 2. Weather broadcasting.**—*C.E.P.B.*

3.8–61 551.509.31

Medrud, Nedler, **A sampling of the synoptic climatology of springtime Tokyo.** *U. S. Air Force, 2143D Air Weather Wing Technical Bulletin*, 1(7):22-30, June **1951.** 16 charts. **DWB**—In order to increase the accuracy of weather forecasts during springtime in Tokyo, the author presents a few of the most typical synoptic sequences to supply climatic information in forecasting. The associated weather is described. *Subject Headings:* **1. Synoptic forecasting 2. Tokyo, Japan.**—*I.L.D.*

3.8–62 551.509.312

§Sen, S. N., **On the utility of correcting barometric tendencies for normal diurnal variations for forecasting in India.** *Indian Journal of Meteorology and Geophysics*, 2(3):179–189, July **1951.** 7 figs. **MH-BH**—The observed barometric tendencies in tropical countries should be corrected for diurnal variation. Seven examples are examined to show the utility of pressure change charts. *Subject Headings:* **1. Barometer corrections 2. Diurnal pressure variations 3. Weather forecasting 4. India.**—*A.A.*

3.8–63 551.509.33(09)(73/9)

U. S. Weather Bureau, **The current long-range forecasting program of the U. S. Weather Bureau.** *Rio Grande Water Forecast Committee, Proceedings*, Second Annual Meeting, April 13, 1951, p. 14-21, Sept. **1951.** charts. **DWB** History of the U. S. Weather Bureau's long range forecasting program is outlined. Methods used are described, and charts showing stages in development of daily prognostic charts for five-day forecasts, and mean monthly charts, forecast charts of pressure and of temperature and precipitation anomalies. Theory is based on projection of mean monthly troughs in the upper level westerlies and changes in zonal index. Uses and limitations as shown by verification are noted. In some areas there has been a marked improvement in skill score. *Subject Headings:* **1. Long range forecasting 2. Waves in the westerlies 3. Extended forecasting 4. United States. I. Lamoreux, Wallace W.**—*M.R.*

3.8–64 551.509.39:551.579:551.577.38(78)

Lamoreux, Wallace W. (*Salt Lake City, Utah*), **Summary of Weather Bureau water supply forecasts.** *Rio Grande Water Forecast Committee, Proceedings*, Second Annual Meeting, April 13, 1951, p. 29, Sept. **1951. DWB** Forecasts for 4 major points on the Rio Grande for the water year Oct. 1, 1950–1951, are given in terms of estimated median, minimum and maximum flow and percent of normal median (ranging from 29% to 63%). Except in Sept. and Jan. precipitation was very deficient in the catchment basin of the Rio Grande. *Subject Headings:* **1. Water supply forecasting 2. Drought 3. Precipitation effects 4. Rio Grande Basin.**—*M.R.*

3.8–65 551.509.58:35

§Douglas, C. K. M., **Forecasting for the D-day landings.** *Marine Observer*, 22(155):16–26, Jan. **1952.** 7 figs. Also in: *Meteorological Magazine*, London, 81(960):161-171, June **1952. DWB**—Account of organization for D-day forecasts, Atlantic synoptic charts June 3–6,

17–19, 1944 and account of the weather in relation to the operations. *Subject Headin* **1. Military meteorology 2. Weather forecasting.**—*C.E.P.B.*

3.8–66 551.509.6:61

Brooks, Edward M., **Meteorology and industrial hygiene.** *American Journal of Pu Health*, 41(5):548-552, May **1951.** 5 refs. Abstracted from reprint. **DWB**—A discuss of those meteorological factors which influence the health and efficiency of industrial work by changes in the pollution of the air to which the workers are exposed. The following aspe of this relationship are considered: 1) the relationship between industrial hygiene and pollution inside industrial plants; 2) relationship between air pollution inside and immediat outside industrial plants and 3) the relationship between air pollution and atmospheric t bulence, general weather situation, seasonal and diurnal effects, sunshine, etc. *Subject He ings:* **1. Meteorology 2. Industrial hygiene 3. Atmospheric pollution.**—*I.L.D.*

3.8–67 551.509

Hall, William Ferguson (*U. S. Weather Bureau, Wash.*), **An evaluation of the technic of cloud seeding to date.** Washington, D. C., U. S. Weather Bureau [1951]. 8 p. 4 fi **DWB**—Presented to New York Academy of Science, Oct. 23, 1951. Statistical tests of 7-d periodicities in precipitation, pressure differences across the Gulf Coast, temperature at mb level over Omaha and other parameters which were found to have high correlation coe cients during the first phase of Project Cirrus' 7-day seeding by silver iodide at Socorro, N Mexico (Dec. 1949–June 1951), show that equally high correlation coefficients have occurr frequently in the past 10 to 50 years. *Subject Headings:* **1. Cloud seeding 2. Silver iod 3. Periodicities 4. Socorro, New Mexico. I. Project Cirrus.**—*M.R.*

3.8–68 551.509.67(67

*Davies, D. A., Hepburn, D. and Sansom, H. W., **Report on experiments at Kongwa artifical stimulation of rain, Jan.–April, 1951.** *East Africa High Commission. Meteorologi Dept., Memoirs*, 2(9), **1951.** 31 p. diagrs., charts, biblio. Price: 5/– s. **DWB**—An area 200 sq. mi. near Kongwa in Central Tanganyika, with a close network of 50 evenly spac standard (5 in.) rain gages, was used to test the efficiency of silver iodide seeding techniqu Local pilot balloon observations, hourly records of clouds and weather conditions and gene synoptic conditions were considered for the seven periods during Jan.–April 1951. T methods were used: (1) standard charcoal burner at ground level and (2) exploding A impregnated gunpowder at the freezing level (15,000 ft) in cumulus clouds. Conditions duri each trial are carefully described and the results summarized statistically. More attemp were unsuccessful than conclusively successful, but there was good evidence, based on 2 ra gages, that much of the rain stimulated fell outside of the test area, that more rain was stim lated by the balloon-bomb technique than by the ground generator method and that attemp should be made in the future to avoid overseeding or delayed seeding. Furthermore, no upp air temperatures were available to determine exact heights of freezing level. Whether or n seeding was responsible, crops were better in this area than in the two preceding years (s *Nature*, v. 167, p. 614, April 14, 1951). Diagrams show location of rain gages, details equipment and isohyets for several of the periods in relation to point of release of bom *Subject Headings:* **1. Cloud seeding techniques 2. Silver iodide 3. Artificial precipitati 4. Kongwa, Tanganyika, British East Africa. I. East Africa High Commission. Meteor logical Dept.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

(*See also items:* 3.8–5, –31, –120, –125, –198, –214, –228)

3.8–69 551.51(

Kvifte, G., **On the distribution of atmospheric sodium.** *Geofysiske Publikasjoner*, Os 17(10), 1951. 16 p. 7 figs., 25 equations. **MH-BH**—A review is given of the results observations on the position of atmospheric sodium and on twilight phenomena. A gene

theory for the evaluation of the upper limit H_u of radiating sodium and of the screening height H_s is given. At present, the most probable values are: $H_s = 42.5$ km; $H_u = 104.5$ km. *Subject Headings:* **1. Atmospheric composition 2. Sodium spectrum 3. Twilight phenomena.**—*A.A.*

3.8–70 551.510.53:523.75

Schweitzer, H., **Haben die Eruptionen auf der Sonne Einfluss auf das Wetter der Erde?** [Do solar eruptions influence terrestrial weather?] *Umschau*, Frankfurt a.M., 52(8):247, 15 April 1952. **DLC**—Quotes record at Berlin 24–25.2.1952 when temperatures at 27 km rose from −64 to −17°C inside 24 hours. At the same time, a large stratospheric high developed over N. Europe and winds at 18–30 km changed from usual W to E (over 100 km/hr). Attributed to a solar eruption early on Feb. 24. Another case at 16 km over Greenland on 8.2.1952 is mentioned. *Subject Headings:* **1. Atmospheric structure 2. Solar flares.**—*C.E.P.B.*

3.8–71 551.510.534(02)

†Fabry, Charles, **L'ozone atmosphérique.** [Atmospheric ozone.] Paris, Centre National de la Recherche Scientifique, 1950. 278 p. 75 diagrs., tables, 155 refs., equations. Biographical note p. 3–5. **MH-BH**—A comprehensive treatment of every aspect of atmospheric ozone in the light of present theoretical and empirical knowledge. The first chapter deals with progress in this field during the past 200 years. Following chapters take up the concentration of ozone in the atmosphere, absorption of radiation, optical properties, methods of observation, spectroscopy, distribution with the temperature of ozone layers in stratosphere, effect of organisms, theory of dissociation of oxygen, and, finally, the variation of ozone with air masses, magnetic storms, etc. An excellent list of references is appended. *Subject Headings:* **1. Ozone research 2. Textbooks 3. Bibliographies.**—*M.R.*

3.8–72 551.510.535:621.396.812

Booker, H. G., Ratcliffe, J. A., Shinn, D. H., **Diffraction from an irregular screen with applications to ionospheric problems.** *Royal Society of London, Philosophical Transactions, Ser. A*, 242(856):579–609, 12 Sept. 1950. 6 figs., 17 refs., 54 equations. **DWB**—Discusses the random fading of a radio wave-field reflected from the ionosphere. In Pt. I it is treated as Fresnel diffraction from a rough screen. In Pt. II the variations of the wave field due to a varying ionosphere are considered: first, on the basis of irregularities which have random velocities and second, from an irregular ionosphere moving with a steady velocity. *Subject Headings:* **1. Ionosphere 2. Radio wave propagation.**—*C.E.P.B.*

3.8–73 551.510.535:621.396.1

Forsgren, Sven K. H., **Some calculations of ray paths in the ionosphere.** *Gothenburg, Sweden. Chalmers Tekniska Högskola, Handelingar*, No. 104, 1951. 22 p. graphs, diagrs., refs. Price: Kr. 3–. (*Gothenburg, Sweden. Chalmers Tekniska Högskola, Research Laboratory of Electronics, Report* No. 17.) **DWB**—Due to earth's magnetic field, waves in the ionosphere deviate horizontally. Purpose of this paper is an attempt to calculate the magnitude of the different deviations of waves. During ionospheric disturbances, when large horizontal gradients of electron density occur, the deviations become more marked. The site of Kiruna is favorable for these studies. Results are presented in elaborate diagrams and approximate theory developed for the refractive index and deviations at vertical incidence. *Subject Headings:* **1. Ionospheric disturbances 2. Microwave propagation 3. Geomagnetism 4. Magnetic field deviations 5. Sweden.**—*W.N.*

3.8–74 551.510.535:551.551

Gallet, Roger, **Sur la nature de la couche E sporadique et la turbulence de la haute atmosphère.** [On the nature of the sporadic E layer and the turbulence of the upper atmosphere.] *Académie des Sciences, Paris, Comptes Rendus*, 233(25):1649–1650, Dec. 19, 1951. ref., equation. **DWB**—An attempt to formulate the relation between the optical turbidity, the changes in molecular density (turbulence) and the electronic density in the high atmosphere as a method of explaining and measuring the fluctuations in the ionospheric E layer. *Subject Headings:* **1. Sporadic E layer 2. Turbulence in the ionosphere 3. Electron density.**—*M.R.*

3.8–75 551.510.535:535.3

Gibbons, J. J. and Nertney, R. J., **A method of obtaining the wave solutions of ionospherically reflected long waves, including all variables and their height variation.** *Journal of Geophysical Research*, 56(3):355–371, Sept. **1951.** 8 figs., table, 3 refs., 25 equations. **MH–BH**—Solution of one-dimensional wave equation with application of wave theory to study of wave propagation in the ionosphere. Reflection coefficients are presented graphically for several distributions of electron density and results compared with experiment. Solution presented here is compared with the W.K.B. method. The author's method gives heights far too low for E layer, but phase heights are consistent with experimental data. *Subject Headings:* **1. Wave equation 2. Ionospheric variations 3. Electron density 4. E layer 5. Wave propagation 6. W.K.B. method.**—*M.R.*

3.8–76 551.510.535:551.521.63

†Michard, Raymond, **Le controle de l'ionosphère par le rayonnement ultraviolet solaire.** [The control of the ionosphere by ultraviolet solar radiation.] *Commission pour l'Étude des Relations entre les Phénomènes Solaires et Terrestres. 7e Rapport*, Paris, **1951.** p. 87–105. tables, 59 refs., equations. **DWB**—Author rapidly reviews statistical studies of relations between ionosphere and sunspots, of ionospheric perturbations during solar eclipses and of sudden disturbances. Theories of ionization of different layers of the ionosphere by solar UV radiation, and of the intensity and origin (corona, chromosphere, photosphere) are discussed and summarized in a table. *Subject Headings:* **1. Ionosphere 2. Ultraviolet radiation 3. Sunspots 4. Ionization.**—*C.E.P.B.*

3.8–77 551.510.535:525.6

Mitra, A. P., **Solar tides in the ionosphere over Calcutta.** *Journal of Atmospheric and Terrestrial Physics*, 1(5/6):286–295, **1951.** 4 figs., 3 tables, 7 refs., 24 equations. **DWB**—The amplitude and phase of semidiurnal and seasonal solar tidal drifts are calculated for the F2 region. *Subject Headings:* **1. Solar tides 2. E layer 3. Calcutta, India.**—*A.A.*

3.8–78 551.510.535:551.590.22

Osborne, B. W. (*Radio Res. Stat., Ditton Park, Slough, Bucks, England*), **Lunar variations in F2 region critical frequency at Singapore.** *Nature*, London, 169(4303):661–662, April 19, **1952.** 2 figs., 4 refs. **DWB**—Midday values of ordinary ray critical frequency are plotted against age of the moon in days, showing a minimum a few days after new moon with amplitude half that at Huancayo. The occurrence of "ledges" during a thick F2 layer also shows marked lunar relations. *Subject Headings:* **1. Ionospheric variations 2. Lunar influences 3. F2 layer 4. Singapore.**—*C.E.P.B.*

3.8–79 551.510.535

Peterson, Allen M. (*Stanford Univ.*), **The interpretation of long scatter echo patterns.** *U. S. Air Force. Cambridge Research Laboratories, Geophysical Research Papers*, No. 7:58–71, Dec. **1950.** 8 figs., 7 refs., 11 equations. **DWB**—The theory of echo delay and of focusing effects is given. Experimental observations are compared with theory. *Subject Headings:* **1. Ionospheric research 2. Ionospheric scattering.**—*A.A.*

3.8–80 551.510.535:550.38

Whale, H. A., **Determination of electron densities in the ionosphere from experimental (h′, f) curves.** *Journal of Atmospheric and Terrestrial Physics*, 1(4):244–253, **1951.** 5 figs., 10 refs., 12 equations. **DWB**—It is shown how a differential analyzer can be used to facilitate the calculation of ionospheric distributions of electron density directly from observed (h′, f) curves by previously known methods. It is pointed out that the simple method, in which the earth's magnetic field is neglected, leads to inacceptable results. A modified method by which the effect of the earth's field can be approximately allowed for is described and it is shown that, when this method is employed, feasible results are obtained. *Subject Headings:* **1. Electron densities 2. E layer 3. Ionospheric research 4. Geomagnetic effects.**—*Author's abstract.*

3.8–81 551.510.535:551.594.7

Whale, H. A., **Fine structure of the ionospheric region E.** *Journal of Atmospheric and Terrestrial Physics*, 1(4):233–243, **1951.** 6 figs., 12 refs. **DWB**—Deals with the vertical distribution of electron density of the E region and the way in which this distribution changes with time. This descriptive investigation is based on a series of accurate (h′, f) records obtained by employing two oscillators. The experimental results are presented in curves and compared with theoretical curves for various model ionospheres. *Subject Headings:* **1. Electron density 2. Electron distribution 3. Radio wave propagation 4. Ionospheric structure 5. E layer.**—*W. N.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

(*See also items:* 3.8–3, –7, –10, –11, –88, –96, –116, –121, –126)

3.8–82 551.511:551.551

Chandrasekhar, S. (*Yerkes Observatory*), **On turbulence caused by thermal instability.** *Royal Society of London, Philosophical Transactions, Ser. A*, 244(884):357–384, March 11, **1952.** 3 tables, 24 refs., 226 equations. **DWB**—A statistical theory of turbulence, caused by the joint effects of gravity and thermal instability, is developed. Restriction to a portion of the fluid far from the bounding surfaces permits treatment as approximately homogeneous and axisymmetric. A fundamental set of solutions governing stationary turbulence is obtained, varying periodically in the vertical. These show that eddies have a minimum wavelength depending on the physical parameters and the temperature gradient. The field of turbulence can be analyzed into two modes characterized by the kinetic energy being confined principally to the vertical or horizontal direction. *Subject Headings:* **1. Instability 2. Turbulence theory.**—*From author's abstract.*

3.8–83 551.511:551.551

Taylor, R. J., **The dissipation of kinetic energy in the lowest layers of the atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 78(336):179–185, April **1952.** 3 tables, 9 refs. **DWB**—Author calculates the flux of kinetic energy into the top of a shallow layer of air bounded below by a uniform horizontal ground surface, using observations by SWINBANK and DEACON (unpublished). Values of energy dissipation per unit mass are calculated for levels of 1–50 m and found to account for over ¼ of the observed rise of temperature 2 to ½ m. The size of the eddies which give the greatest dissipation of energy is calculated from expressions by RICHARDSON and G. I. TAYLOR giving lengths of 2–9 cm at 2 m height. *Subject Heading:* **1. Eddy viscosity.**—*C.E.P.B.*

3.8–84 551.511:551.543.2

Thrane, P., **Some hydrodynamical properties of simple atmospheric oscillations with applications to the semidiurnal oscillation.** *Geofysiske Publikasjoner*, 18(1), **1951.** 36 p. 5 figs., 127 equations, 11 refs., append. with a mathematical summary. **MH-BH**—The properties of oscillations having either a 24-hour or a 12-hour period are examined for a region near the pole. If the pressure wave is known from observations, the values of the variation of the supplied heat in the semidiurnal oscillations can be obtained. The dependence of the amplitude and phase angle with height is computed. *Subject Headings:* **1. Atmospheric oscillations 2. Pressure oscillations.**—*A.A.*

3.8–85 551.511:551.55

Watanabe, T., **Notes on the theory of advection.** *Journal of Meteorological Research*, Tokyo, 3(7):235–241, May **1951.** 4 figs., refs., equations. In Japanese. English summary p. (17). **DWB**—A critical examination of the physical bases of the general theory of advection. Equations of vertical displacement $\left(\delta_z = \frac{\partial \pi}{x} \int \frac{dv}{p}\right)$ should be integrated by the initial and not the final coordinates since pressure, density and temperature depend upon the initial coordinates of the air column under consideration. Moreover, the assumption of adiabatic process should

be applied to individual air particles. *Subject Headings:* **1. Advection theory 2. Dynamics of the atmosphere.**—*I.L.D.*

GENERAL CIRCULATION

(*See also items:* 3.8–8, –9, –95, –118, –182, –202)

3.8–86 551.513:525.35

Faust, Heinrich, **Warum gibt es ein Wetter?** [Why do we have weather?] *Umschau*, Frankfurt a.M., 50(6):171–173, March **1950.** 3 refs. **DLC**—The Coriolis force and its effect on the preservation of air masses is explained. The influence of rotation speed of the earth on atmospheric circulation is discussed. Considering that lunar tide slows down rotation, author pictures the earth's climate at various stages of our planet's history from extremely stormy geologic times to a remote future, when, at a rotation speed of one revolution per annum, most of the atmosphere is expected to settle down in liquid form on the hemisphere away from the sun. *Subject Headings:* **1. Coriolis force 2. Atmospheric circulation 3. Rotation of the earth.**—*G.T.*

3.8–87 551.513.1

Bjerknes, J. A. B., **Practical applications of H. Jeffrey's theory of the general circulation.** *International Union of Geodesy and Geophysics, Association of Meteorology, Transactions*, Oslo, 1948, 2:53–55, **1950.** Mimeographed. **DWB**—On the basis of JEFFREY's theory of the general circulation, the equality of the supply and loss of angular momentum in the atmosphere is expressed as follows:

$$a^2 \cos^2 \phi_n \int_0^{2\pi} \int_0^{\alpha} p V_x V_y d\lambda dz - a^2 \cos \phi_{n+1} \int_0^{2\pi} \int_0^{\alpha} p V_x V_y d\lambda dz = a^3 \int_{\phi_n}^{\phi_{n+1}} \int_0^{2\pi} \gamma_{0x} \cos^2 \phi d\phi d\lambda$$

a = radius of earth; p = air density; V_x = westwind component; V_y = southwind component; z = height above sea level; ϕ_n and ϕ_{n+1} = geographical latitude of southern and northern edge of zone; λ = geographical longitude; and γ_{0x} = x-component of wind stress at earth's surface. Its application to calculating momentum transport is discussed. *Subject Headings:* **1. General circulation 2. Transport of momentum 3. Mechanics of the atmosphere.** *I.L.D.*

3.8–88 551.513.1:551.511

California. University at Los Angeles, **Investigation of the general circulation of the atmosphere.** Contract AF19(122)-48, Reports, No. 1–6; Appendix to No. 4; No. 7, Pt. 1–4; 8, Pt. 1–3, Sept. 15, **1949**–June 15, **1951.** 14 pieces. diagrs., graphs, charts, refs., equations. **DWB**—A number of individual studies are included in this series. For example, a study of the angular momentum budget, including winter and summer Northern Hemisphere map analysis for 300, 200 and 100 mb surfaces as well as other levels; tropopause intersection with 300, 200 and 100 mb surfaces to detect stratospheric sinks; study of unstable upper waves and their non-geostrophic contribution to momentum transfer; constancy; divergence and vorticity of the surface wind; geostrophic poleward flux of angular momentum and of sensible heat; the effect of winds and tides on lengths of day; etc. *Subject Headings:* **1. General circulation 2. Angular momentum budget 3. Transport of momentum 4. Geostrophic winds 5. Length of day. I. Contract AF19(122)-48 II. Bjerknes, Jakob A. B. III. Dean, Gordon IV. Kochanski, Adam V. McSparron, J. VI. Mintz, Yale VII. Munk, Walter VIII. Eliassen, Arnt.**—*M.R.*

ATMOSPHERIC DISTURBANCES

(*See also items:* 3.8–4, –5, –11, –154, –202)

3.8–89 551.515.8:550.34(48)

Båth, Markus, **The microseismic importance of cold fronts in Scandinavia.** *Archiv för Geofysik*, 1(12):267–258, **1951.** 39 figs., tables, equations, 29 refs. Also: *Uppsala. (K.) Universitetet, Meteorologiska Institutionen, Meddelande*, No. 21, **1951. MH-BH**—A detailed study of the problem including a review of preceding investigations and theoretical considerations. Relationship between sea wave heights and wind velocities is examined. The micro-

seismic influence of cold fronts is discussed for 18 individual cases. *Subject Headings:* **1. Microseisms 2. Cold fronts 3. Wind waves 4. Scandinavia.**—*A.A.*

3.8–90 551.515.8:551.586:639.22(261)

Die Bedeutung der arktischen Front für die nordeuropäischen Fischereigebiete. [The importance of the Arctic front for the north European fishing areas.] *Wetterlotse*, Hamburg, No. 1:4–7, Jan. 1949. 2 figs. **DWB**—Intensity of storms, weather conditions, water and air temperatures in the Barents Sea are discussed. *Subject Headings:* **1. Arctic fronts 2. Climatic influences 3. Fishing 4. Barents Sea.**—*I.L.D.*

3.8–91 551.515.8(433)

Faust, Heinrich, **Die synoptischen Bedingungen für das Entstehen der Unwetterfront vom 22.7.1948 über Nordbayern.** [Synoptic conditions for the formation of the storm front of July 7, 1948, over northern Bavaria.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 19:29–32, 1950. fig., table, 5 refs. **DWB**—The synoptic situation over western Europe associated with the storm front is analyzed in order to establish a relationship between the wind storm and the immediately preceding cold front. The isochrones of the two fronts involved in the wind storm are described. The author discusses the possibility of the formation of a strong local overturning in the vicinity of Strasbourg, the weather phenomena in the "stormy" area of the Black Forest, the development of the first cold front and of the second cold front over southern Germany. *Subject Headings:* **1. Squalls 2. Secondary depressions 3. Synoptic meteorology 4. Bavaria, Germany.**—*I.L.D.*

3.8–92 551.515.8:551.526.6

Hanzawa, Masao and Takeda, Nobuo, **Preliminary report on the transformation of the Siberian Pc airmass travelling over sea in winter.** *Oceanographical Magazine*, Tokyo, 2(2): 69–75, June 1950. 7 figs., 12 refs., 3 equations. **MH-BH**—In this study of the transformation of the polar continental air mass coming from Hokkaido to the North Pacific Ocean, sea surface trajectories are determined by PETTERSEN's method but using actual winds on the sea surface. The rate of increase of mixing rates along the trajectory of the air mass is calculated. *Subject Headings:* **1. Air mass modification 2. Sea surface temperatures 3. Air trajectories.**—*I.L.D.*

3.8–93 551.515.8:551.553.8

Lloyd, W. M. G. and Crumpton, P. F., **Line squall, Australian waters.** *Marine Observer*, 22(155):7–8, Jan. 1952. 2 figs. **DWB**—March 27, 1951, 36°43′S., 150°22′E. Rotating cloud bank separated warm NIy from cool Sly wind. *Subject Heading:* **1. Line squalls.**

3.8–94 551.515.8

Sawyer, J. S., **Dynamical aspects of some simple frontal models.** *Royal Meteorological Society, Quarterly Journal*, 78(336):170–178, April 1952. 3 refs., 21 equations. **DWB**—Considering a frontal surface as a simple discontinuity of density between air masses within which there is a nonuniform distribution of temperature or motion, it is shown that there must be upsliding or downsliding of one air mass relative to the other at the frontal surface. The computed relative vertical velocities are of the same order but slightly smaller than those believed to occur in nature. *Subject Headings:* **1. Frontal structure 2. Vertical velocity.**—*C.E.P.B.*

3.8–95 551.515.8:551.513.2

Sawyer, J. S., **Memorandum on the intertropical front.** *Great Britain. Meteorological Office, Meteorological Reports*, No. 10, 1952. 14 p. 9 figs., table, 8 refs. M.O. 535e. **DWB**—A discussion of recent literature. Characteristics over oceans described, including wind flow and equatorial westerlies, lapse rate of temperature and moisture, and cloud structure, with a brief reference to flying conditions. The front at the monsoon limits over continents is similarly dealt with. Mean position in Jan. and July is shown on charts and relations to tropical cyclones and "waves in the easterlies" discussed. *Subject Headings:* **1. Atmospheric circulation 2. Intertropical convergence zone 3. Tropical fronts.**—*C.E.P.B.*

3.8–96 551.515.81:551.515.11

§Økland, H., **On the ageostrophic motion of fronts.** *Meteorologiske Annaler*, 3(7):191–204, **1951.** 3 figs., 2 tables, 4 refs., equations. **DWB**—An expression is derived, suitable for application to weather charts, giving the ageostrophic motion of a front as a percentage of the geostrophic motion normal to it. This is proportional to tan (angle between axis normal to front and cold air isobar) and leads to other results agreeing fairly well with observations. A practical method of approximate calculation is described and some examples analyzed. *Subject Heading:* **1. Fronts.**—*C.E.P.B.*

3.8–97 551.515.827

Chappaz, Raymond, **Ein Beispiel für die Bildung einer sekundären Warmfront vor einer Warmfront.** [An example of the development of a secondary warm front in advance of a warm front.] *Meteorologische Rundschau*, 4(9–10):181–182, Sept.–Oct. **1951.** 2 figs. **MH-BH**—A secondary warm front over Rhineland on Jan. 15, 1951 is illustrated by cloud sketch from an airplane. Secondary front cloud mass reached 17,000 ft, that of main front overlapped at 30,000 ft. They are shown also in thermograms for the Black Forest and Friedrichshafen. *Subject Headings*: **1. Warm fronts 2. Rhineland, Germany.**—*C.E.P.B.*

3.8–98 551.515.83:551.582.1:551.589.1(47)

Fedorov, E. E., **Izmenenie v tipakh mestnoĭ pogody v kontinental'noĭ tropicheskoĭ vozdushnoĭ masse v letnie mesiatsy na ee puti s iugavostoka i iuga k Moskve.** [Change in the types of local weather in continental tropical air masses during summer on its trajectory from southeast and south to Moscow.] *Akademiia Nauk, SSSR, Institut Geografii, Trudy*, v. 48, Voprosy Klimtologii, **1950.** p. 71–87. 5–9 tables, 7 refs. **DLC**—The frequencies of the trajectories of the continental tropical air mass during the summer are calculated over the period 1900–1917 for a series of successive localities and the local weather types (characterized by Fedorov's method relative to the movement of this air mass from the southeast and east towards Moscow) are described. It is concluded that changes in local climate during the passage of the air mass are due more to local factors involving radiation balance, but especially in moisture content of air near the surface. *Subject Headings:* **1. Air mass trajectories 2. Weather types 3. Climate of Moscow 4. Air mass modification 5. Moscow, U.S.S.R.**—*I.L.D.*

RADIATION AND TEMPERATURE

RADIATION

(*See also items:* 3.8–76, –199)

3.8–99 551.521.64:523.74

Grotrian, W. and Kunzel, H., **Über den Induktionsfluss durch Sonnenfleckengruppen der Klassen β_γ und γ.** [On the induction current through sunspot groups of classes β_γ and γ.] *Zeitschrift für Astrophysik*, 29(2):173–176, **1951.** 8 tables. **DLC**—From data of Mt. Wilson Observatory the polarity and induction currents in 8 large groups of sunspots, and their time changes of field, were estimated. The results are briefly discussed in relation to corpuscular radiation from solar flares. *Subject Headings:* **1. Solar physics 2. Corpuscular radiation.**—*C.E.P.B.*

3.8–100 551.521.64:550.385

Kato, Yoshio and Kanno, Tsunekichi, **On the variations of the cosmic-ray intensity associated with the magnetic storm.** *Tohoku University, Science Reports, 5th Ser., Geophysics*, 2(3):153–157, Dec. **1950.** 4 figs., 2 tables, 15 refs., 2 equations. **DWB**—A theoretical attempt to correlate the variation of cosmic ray intensity with the radius of the equatorial ring-current. It is shown that the calculated correlation coefficient is not high enough, and the reasons are discussed. *Subject Headings:* **1. Cosmic ray intensity 2. Magnetic storms.**—*W. N.*

3.8–101 551.521.64:550.38

†Newton, H. W. and Jackson, W., **Observational aspect of solar corpuscular radiation.** *Commission pour l'Étude des Relations entre les Phénomènes Solaires et Terrestres, Rapport* 7e,

Paris, 1951. p. 107–130. 3 figs., 2 tables, 38 refs. **DWB**—After a history of investigations and theories since 1882, authors discuss detection of solar corpuscular streams and statistical results of observations of sunspots, solar flares and magnetic character figures. Time interval between solar flares and intense magnetic storms averages 30 hours. Problems of small storms, relations of aurora and ionosphere, etc. are discussed. A large number of important solar flares, and their magnetic effects, are tabulated. *Subject Headings:* **1. Corpuscular radiation 2. Terrestrial magnetism 3. Solar flares.**—*C.E.P.B.*

3.8–102 551.521.64:523.7(47)

Ol', A. I., **Izmeneniia intensivnosti kosmicheskikh lucheĭ, sviazannye s deiatel'nost'iu solntsa.** [Variations of the intensity of cosmic rays as a result of solar activity.] *Priroda*, Moscow, 40(11):48–52, **1951.** 3 figs., table, 17 refs., 2 equations. **DLC**—A detailed review of recent Russian and non-Russian studies on the variations in the intensity of cosmic radiation, namely transitory intensification and extended weakening, observed during magnetic storms. *Subject Headings:* **1. Cosmic ray intensity 2. Cosmic ray research 3. Magnetic storms 4. Solar activity 5. U.S.S.R.**—*I.L.D.*

3.8–103 551.521.64

†Pfotzer, G., **Die Neutronenkomponente der Ultrastrahlung.** [The neutron component of cosmic radiation.] *Naturwissenschaften*, Berlin, 39(7):149–158, April 1, **1952.** 11 figs., 2 tables, 59 refs., equations. **DWB**—This article summarizes numerous recent investigations. Neutron components increase exponentially with height (up to 20 km). Energy spectra extend from 0.4 to 10^7 eV. Other sections discuss retardation and absorption in air, methods of measurement, results in the atmosphere—neutron density, path length, latitude effects and variation of different components with heights—"shower" formation and the place of neutrons in the complex of cosmic radiation. The absorption and formation of neutrons in the atmosphere is examined, the various measurements fitting a linear relation with height. *Subject Headings:* **1. Cosmic radiation 2. Neutrons.**—*C.E.P.B.*

3.8–104 551.521.64:537.59

Pullar, J. D. and Dymond, E. G., **Meson production in the atmosphere.** *Philosophical Magazine*, 42(329):663–664, June **1951.** fig., 2 refs. **DWB, DLC**—The variation with height of the penetrating component of cosmic radiation was measured by a series of 7 balloon flights with radiosondes up to a maximum altitude of 124,000 ft (4 mb) at Edinburgh. The intensity at the top of the atmosphere is found by extrapolation to be 23 times the value at the ground. This figure is compared with previous estimates, and the amount due to lateral showers at low pressures is considered in determining true vertical rate. *Subject Headings:* **1. Cosmic radiation 2. Meson production 3. Upper atmosphere 4. Edinburgh, Scotland.**—*M.R.*

3.8–105 551.521.64:523.7

Roka, E. G. von, **Sonnenaktivität und kosmische Strahlung.** [Activity of the sun and cosmic radiation.] *Zeitschrift für Naturforschung*, Tübingen, 6a(3):117–122, March **1951.** graphs. refs. **DLC**—Data on cosmic ray intensity obtained at Huancayo, Peru from Nov. 1939 to Dec. 1946 were used to calculate the behavior of cosmic radiation intercepted in an ionization chamber at 3350 m elevation on successive days up to 60 days before or after certain selected days (selected because of high cosmic ray incidence). It is shown that there is a strong negative correlation with relative sunspot number, and that the 27-day cosmic radiation wave lags 4–6 days behind the sunspot wave. The author concludes that the 27-day cosmic ray wave cannot be connected with a solar component of cosmic radiation but with a terrestrial magnetic effect induced by the sunspot cycle (based on data from 1936–1944). *Subject Headings:* **1. Cosmic radiation 2. Solar activity 3. Huancayo, Peru.**—*M.R.*

3.8–106 551.521.64:537.59

Rose, D. C., **The sudden increase in cosmic ray intensity, November 19, 1949.** *Canadian Journal of Physics*, 29(3):227–235, May **1951.** 4 figs., table, 11 refs. **DWB**—The cosmic ray counter telescopes set up at Ottawa and Resolute, Canada are described. The sudden increase in intensity of cosmic rays at Ottawa reached a maximum of 70% above normal in a few

minutes and decayed slowly to normal in about four hours. At Resolute the increase was gradual and attained only an increase of 20% above normal; the return took about three hours. It is concluded that the cosmic rays causing the main increase in intensity strike the earth in a narrow cone, which in the Northern Hemisphere crosses North America but does not strike Europe. The smaller effect at Resolute may be explained as the result of a weaker cone or a penumbra effect. *Subject Headings:* **1. Cosmic ray intensity 2. Cosmic ray variations 3. Cosmic ray instruments 4. Ottawa, Canada 5. Resolute, Canada.**—*I.L.D.*

3.8–107 551.521.64

Teucher, M., **Die Absorption der Nukleonenkomponente der kosmischen Strahlung in Luft zwischen Seehöhe und 4000 m.** [The absorption of the nucleon component of cosmic radiation in air between sea level and 4000 m.] *Zeitschrift für Naturforschung*, 7a(1):61–63, Jan. **1952.** 2 figs., table. **DLC**—Showers in photographic emulsion were counted at 5 heights from 150 to 3774 m, showing increase from 1.3 to 26.6 per day/cm³, related to air density h (gm/cm³) by $N = N_0 e^{-h/L}$. *Subject Heading:* **1. Cosmic radiation.**—*C.E.P.B.*

3.8–108 551.521.64

v. H—, H., **Was sind V-Teilchen?** [What are V-particles?] *Umschau*, Frankfurt a.M., 52(4):106, Feb. 15, **1952.** fig. **DLC**—V-particles cause V-shaped traces in photo plates, especially at high levels. Theories and observations are summarized. *Subject Heading:* **1. Cosmic radiation.**—*C.E.P.B.*

3.8–109 551.521.64:537.59

Voisin, André G., **On the penetrating showers of cosmic rays.** *Canadian Journal of Physics*, 29(3):206–216, May **1951.** 9 figs., 4 tables, 25 refs. **DWB**—The penetration of particles from local showers produced in lead blocks above counters has been measured in experiments, carried out at sea level, as a function of the angular width of the cone particles. The shower particles are assumed to be mesons. The analyzer counters were connected in coincidence. It was found that showers of particles are more penetrating with increasing width of angular spread and that an average number of 3.7 particles per shower was contained in a cone of half angle of about 15°. *Subject Headings:* **1. Cosmic ray showers 2. Cosmic ray research 3. Meson intensity.**—*I.L.D.*

TEMPERATURE

(*See also items:* 3.8–92, –120, –123, –142, –199, –207)

3.8–110 551.524:551.577(931)

Seelye, C. J. and Bondy, F. (*Meteorological Office, Wellington, Australia*), **Temperatures associated with rainfall in New Zealand.** *New Zealand. Meteorological Service, Meteorological Office Note*, No. 31, **1947.** 6 p. table, 3 charts. Reprinted from *New Zealand Journal of Science and Technology*, 28(4), Sec. B, p. 253–258, **1947.** **DWB**—Ten-year temperature data for wet days from 23 stations distributed over New Zealand are presented and analyzed. It is found that temperature associated with rain is about 2°F lower near the east coast than near the west coast in winter, while no significant difference appears in summer. Departure of mean for wet days from general daily mean is presented in charts. *Subject Headings:* **1. Temperature-precipitation relations 2. New Zealand.**—*G.T.*

3.8–111 551.524.32:551.506.3(969)

*Palmer, Harold S., **Annual march of daily mean temperature at Honolulu.** *Pacific Science*, Honolulu, 4(1):50–54, Jan. **1950.** tables, graph. **DLC**—Average temperature data at Honolulu for 58 years (1890–1947) are presented in a table and on a graph for each day o the year. A number of peaks and troughs occur in the period from Jan. 1 to March 15 during which the lowest temperature of the year usually occurs, and similar but less noticeable fluctuations in the "plateau" of the annual curve, which occur during July–Sept. No significance could be attached to any of these fluctuations, since the highest or lowest temperature of the

year seldom occurs on the same day twice, and the variation is over a period of a month or two. The average coldest day, however, is Feb. 13 (54 days after the solstice), and the warmest on Aug. 20 (60 days after the solstice). It cools off faster in Nov. than it warms up in April–June. *Subject Heading:* 1. Annual temperature variations 2. Temperature singularities 3. Temperature data 4. Honolulu, Hawaii.—*M.R.*

3.8–112 551.524.36:662.9

Sporn, Philip and Ambrose, E. R., **Tests show how heat pumps perform in different climates.** *Electrical World*, New York, 135(7):97–100, Feb. 12, 1951. diagr., tables, photo., refs. DLC Chart tables show expected performance of heat pumps in test houses at 5 different locations in the U. S.: South Bend, Ind., Coshocton, Ohio, Roanoke and Abingdon, Va. and Kingsport, Tenn., based on degree-days in normal heating season, and in test period, May 1949–April 1950. *Subject Headings:* 1. Heat pumps 2. Degree-day data 3. Eastern United States.—*M.R.*

3.8–113 551.524.37

Parrenin, H., **Sur un dispositif automatique destiné à protéger les cultures contre les gelées.** [On an automatic device designed to protect crops against freezing.] *La Météorologie*, 4th Ser., No. 11:211–228, July–Sept. 1948. 7 figs. DWB Methods of measuring the temperature of plants or fruits and of ambient conditions among the crop; the effects of radiation and air drainage; frost pockets; methods of protection against frost (heating in crops, smudging, use of helicopters, airplanes, infrared radiation, etc.) are discussed. The automatic firing of a battery of heaters or smudge pots whenever the temperature in the crop drops below a set value is recommended, and experiments conducted on this at the Agricultural Experiment Station in Drome, France, are described. The automatic warning apparatus consisting of an anemometer, thermometer and batteries is described and illustrated. Costs for heating, ventilation, infrared radiation and smudging are compared, and a combined heating and smudging system (automatic) recommended as cheapest and best. *Subject Headings:* 1. Frost protection 2. Viticulture 3. France.—*M.R.*

3.8–114 551.524.37

Weger, N. *Geisenheim*, **Brauchbarkeit von Lufttrübungsmitteln zur Frostabwehr.** [Usefulness of methods for producing atmospheric turbidity in frost prevention.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 32:83, 1952. DWB Materials for producing smoke or fog for frost prevention often damage the plants. No harmful effects are observed when aluminum chloride is used. *Subject Headings:* 1. Agricultural meteorology 2. Chemical injury to plants 3. Frost prevention.—*A.A.*

3.8–115 551.524.37:581.05

Wie kommt es zum Frosttod der Pflanze? [What causes frost death of the plant?] *Umschau*, Frankfurt a.M., 51(24):759, Dec. 1951. 3 refs. DLC The material in this summary of an investigation on the effect of frost on plants is taken from "Cell physiological studies of frost resistance: a review" by G. W. Scarth, *New Phytologist*, 43:1, 1944. Harmful effects are caused by: (a) freezing inside cells, (b) freezing between the cells and (c) effects of desiccation, respectively, in order of extent of damage. Thus, ice or desiccation, not low temperature itself, kills the plant. *Subject Headings:* 1. Plant freezing 2. Frost damage 3. Desiccation.—*G.T.*

3.8–116 551.524.4:551.515.11

Rodewald, Martin, **Luftmassen können warme oder kalte Füsse haben.** [Air masses may have warm or cold feet.] *Wetterlotse*, Hamburg, No. 38:57–63, April 1952. 4 figs. DWB—A general account of the vertical temperature gradient in different air masses, changes at fronts and structure of depressions. *Subject Headings:* 1. Barometric depressions 2. Vertical temperature gradient 3. Air masses.—*C.E.P.B.*

3.8–117 551.524.7:551.501.45

Chiplonkar, M. W. and Nandgaonkar, M. L., **On the relations between the standard deviations of temperature at constant pressure and at constant height.** *Royal Meteorological*

Society, Quarterly Journal, 78(336):268–271, April, **1952.** figs., table, 4 refs., 3 equations. **DWB**—CHIPLONKAR and NANDGAONKAR criticize a formula suggested by N. CARRUTHERS. CROSSLEY replies. *Subject Heading:* **1. Pressure-temperature correlations. I. Crossley, A. F. II. Carruthers, N.**—*C.E.P.B.*

ATMOSPHERIC PRESSURE AND WIND

PRESSURE

(*See also items:* 3.8–6, –43, –84)

3.8–118 551.543:551.513.7

Petitjean, Lucien, **Sur la propagation d'ondes de pression quasi stationnaires.** [On the propagation of quasi-stationary pressure waves.] *Académie des Sciences, Paris, Comptes-Rendus*, 233(12):665–666, **1951. DWB**—A note giving briefly the results of a study of the trajectories of semistationary high or low pressure waves, and their propagation in different seasons and parts of the earth. The anomalies are centered in such regions as Iceland, the Gulf of Mexico, the Urals, Lapland, etc., from which centers they radiate. *Subject Headings:* **1. Dynamic climatology 2. Quasi-stationary pressure waves 3. Symmetry points.**—*M.R.*

3.8–119 551.547

Lillywhite, J. W., **The use of Pomar reports in constant pressure analysis.** *Weather Development and Research Bulletin*, Melbourne, No. 17:5–8, Aug. **1951.** 2 figs., equations. **DWB**—Two nomograms are presented for determining the heights of the 700 mb or 500 mb surfaces from the pressure altimeter reading (assuming zero at 1013.2 mb, 15°C at sea level and standard lapse rate), the radar altimeter reading (or departure from pressure altimeter reading) and the ambient temperature. Or the temperature at 700 or 500 mb can be calculated by use of these graphs if the other variables are known. Theory and construction of charts as well as their use in practice are outlined. *Subject Headings:* **1. Altimeter corrections 2. Constant pressure analysis 3. Pomar reports.**—*M.R.*

3.8–120 551.547.3:551.524.7:551.510.5

Isozaki, I., **On the pressure and temperature variations in the upper troposphere.** *Journal of Meteorological Research*, Tokyo, 2(12):363–373, Dec. **1950.** 7 figs., 6 tables, 9 refs., 8 equations. In Japanese, English summary, p. (11). **DWB**—From the statistical relations between pressure and temperature some conclusion regarding the mechanism of pressure and temperature variations in the troposphere are deduced. Pressure variations of 1 mm Hg correspond to temperature variations of 1°C in the upper troposphere. Both temperature and pressure decrease horizontally towards northern latitudes and the horizontal pressure decrease of 1 mm Hg corresponds to a horizontal temperature decrease of 1°C. The mechanism of pressure and temperature variations is explained on the assumption that the isobaric surface and isothermal surfaces move horizontally and maintain barotropy. It is concluded that barotropic variations in the atmosphere occur in all layers from 4 km to the tropopause. *Subject Headings:* **1. Upper air pressure 2. Upper air temperatures.**—*I.L.D.*

TURBULENCE

(*See also items:* 3.8–74, –82, –83, –85, –129)

3.8–121 551.551:551.511(09)(410)

†Calder, K. L., **Progress in the problems of atmospheric turbulence 1939-1947.** *International Union of Geodesy and Geophysics, Association of Meteorology, Oslo, 1948, Procès-verbaux*, 3:131–137, Nov. **1950.** 34 refs. In English. **DWB**—Over 30 papers on turbulence have been published in the United Kingdom between 1939 and 1947. These are listed and the work of the major research workers, as evidenced by these papers, summarized. *Subject Headings:* **1. Turbulence research 2. British Isles.**—*M.R.*

3.8–122 551.551

Corrsin, Stanley, **Patterns of chaos.** *Johns Hopkins Magazine*, 3(4):10–14, 30–32, Jan. 1952. 13 photos. **DLC**—Popular account of theoretical and practical aspects of turbulence with photos showing occurrences of laminar and turbulent motion in smoke and water. Statistical approach in investigating turbulence, use of electronic equipment (hot wire anemometers in particular) and Johns Hopkins University's achievements in the field are discussed. *Subject Headings*: **1. Turbulence research 2. Turbulence theory 3. Hot wire anemometers 4. Johns Hopkins University.**—*G.T.*

3.8–123 551.551:551.524.4:551.571.4:551.558

Craig, Richard A., **Vertical eddy transfer of heat and water vapor in stable air.** *Journal of Meteorology*, 6(2):123–133, April 1949. 5 figs., 3 tables, 26 refs., 23 equations. **MH-BH**—Based on about 30 airplane soundings representing simple conditions made in the lowest 100 ft over Massachusetts Bay, the effect of eddy diffusion in modifying an air mass travelling from land to sea (30 miles over water) is analyzed. Numerical values of eddy diffusivity and evaporation are calculated for each sounding and stability type and theoretical models showing the changes in lapse rates developed. Conclusion is that height to which air masses are modified in travelling 50 miles over warm water is only a few hundred feet, increases most rapidly at first, and depends on stability. *Subject Headings*: **1. Eddy diffusion 2. Heat transfer 3. Water vapor transport 4. Air mass modification 5. Airplane soundings 6. Massachusetts Bay.**—*M.R.*

3.8–124 551.551

Inoue, Ei-ichi, **On the turbulent diffusion in the atmosphere (II).** *Meteorological Society of Japan, Journal, 2nd Ser.*, 29(7):246–253, July 1951. fig., table, 5 refs., 17 equations. In English, Japanese summary p. 253. **DWB**—The author applies theoretical results obtained in his first paper to actual conditions in the atmosphere; namely, horizontal diffusion and vertical diffusion of smoke. Horizontally the processes are considered isotropic, but vertically they are obviously not. Measurements were made during Aug. 1948 by the author, using puffs of smoke from fireworks photographed at 1 sec intervals. Assuming 90% of the smoke to be contained in the area which could be traced from the photographs, calculations of various turbulence parameters are made for heights of 3, 5 and 6 m and compared with values obtained by RICHARDSON for $Z = 2$ m. Results show that the length of the highest turbulence element is about 10% of its height, and is restricted by the distance from the earth's surface. The boundary between isotropic and nonisotropic turbulence is a function of heights above ground. Smoke from a moving locomotive is also considered. (For Pt. I *see item* No. 2.7–114 in July 1951 *Meteorological Abstracts*.) *Subject Headings:* **1. Turbulent diffusion 2. Isotropic turbulence.**—*M.R.*

3.8–125 551.551:551.553.5:551.508.5:551.510.42

Massachusetts Institute of Technology, **Research on turbulence and diffusion of particulate matter in the lower layers of the atmosphere.** Contract AF28(099)-7, Progress Report No. 9, Feb. 10, 1951. 34 p. 16 figs., tables. **DWB**—Progress report on work done at Round Hill (Mass.) Field Station of M.I.T. during Nov. and Dec., 1950, and Jan. 1951. A report on progress in instrumentation by GERALD C. GILL mentions the fast-response wind and temperature measuring instruments used to measure vertical currents and sudden variations in horizontal movement of wind. Calibration of instruments took place in two wind tunnels at M.I.T. (Cambridge), but one is to be constructed at Round Hill according to design outlined. CRAMER reports on a detailed study of short period fluctuations in wind speed and direction for the purpose of determining the diurnal variation in intensity and scale of atmospheric turbulence as related to diffusion. FRANK C. RECORD discusses a statistical study of eddy motion based on point-source smoke runs made June 29, 1950. *Subject Headings:* **1. Amospheric diffusion 2. Atmospheric turbulence 3. Smoke plumes 4. Turbulence instrumentation. I. Hewson, E. Wendell II. Gill, Gerald C. III. Cramer, Harrison E. IV. Record, Frank A. V. Contract AF28(099)-7.**—*M.R.*

3.8–126 551.551:551.511

Takeda, K., **On the atmospheric turbulence, 2nd paper. On the generalized exponential formula.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 29(7):233–245, July **1951.** fig., 2 tables, refs., numerous equations. In Japanese, English summary p. 243–245. **DWB**—Theoretical work following that of DEACON (1949), PASQUILL (1949), SUTTON (1949), CALDER (1939 and 1949) and SHEPPARD (1947). The author disagrees with DEACON's idea that the roughness parameter (Z_0) is constant, but that it varies with stability, and explains this on the grounds that when the air is stable, the roughness elements such as trees, leaves, brush, etc. exert a smaller influence on air flow than under unstable conditions. PASQUILL's values for $K/z^2 \frac{\partial u}{\partial z}$ are compared tabularly with the author's values. *Subject Headings:* **1. Atmospheric turbulence 2. Roughness parameter, Z_0 3. Turbulence theory. I. Deacon, E. L. II. Pasquill, F. III. Sutton, O. G. IV. Calder, K. L. V. Sheppard, P. A.**—*M.R.*

WIND

(*See also items:* 3.8–92, –125, –129, –204)

3.8–127 551.552(261)

Markgraf, Hans, **Neue nordatlantische Windkarten.** [New wind charts for the North Atlantic.] *Annalen der Meteorologie*, 4(1–6):248–251, **1951.** 5 figs. **MH-BH**—A description of the wind roses in the planned "Steamer handbook for the N. Atlantic" and comparison with KÖPPEN's (1899), and the representation of prevailing winds by arrows of different thickness. *Subject Headings:* **1. Wind roses 2. Wind charts.**—*C.E.P.B.*

3.8–128 551.553:551.556.3

*Arzt, Theodor, **Die Windverhältnisse in der Rhön unter besonderer Berücksichtigung der Ausnutzbarkeit des Windes als Energiequelle.** [Wind conditions in the Rhön range with special reference to the utilization of the wind as a source of energy.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 21, **1951.** 31 p. diagrs., tables, graphs, biblio. Price DM 3,–. **DWB**—Wind velocity and direction were determined by means of self-recording cup anemometers at elevations of 0.5 m to 16.0 m above the ground at the stations Hochrhön and Wasserkoppe. The author discusses the topography of the terrain over which the observations were made, the method of making the observations and of determining the mean wind velocity, the frequency of the mean velocity of the individual wind directions, distribution of the hourly means into wind velocity classes, the daily march of the wind, the yearly march of wind velocity, high wind velocities, gustiness of the wind and the meteorological considerations involved in the construction of wind power installations. The data on wind velocities are given in tables. *Subject Headings:* **1. Wind variations 2. Wind utilization 3. Wind measurements 4. Wind data 5. Rhön range, Germany.**—*I.L.D.*

3.8–129 551.554:551.551

†Franke, Martin, **Die Höhen- und Zeitabhängigkeit des Austauschkoeffizienten in der Bodenschicht.** [The dependence of the austausch coefficient in the surface layers on altitude and time.] *Geofisica Pura e Applicata*, 20:87–130, July–Dec. **1951.** 6 figs., 7 tables, 20 refs., numerous equations. In German; English and German summaries p. 87–88. **MH-BH**—Based on micrometeorological data for Leafield, England (N. K. JOHNSON and G. S. P. HEYWOOD) and Ismaila, Egypt (W. D. FLOWER), certain periods have been selected to illustrate the diurnal, seasonal and climatic variations in eddy diffusivity with respect to heights, and under varying cloudiness, wind and radiation conditions. Data obtained by FRITZSCHE and STANGE, and by LETTAU for $Z = 10$ to 70 m are compared with data obtained in this study for day, night and mean conditions on a clear June day. Present data agree up to 30 m but at 70 m are $\frac{1}{2}$ to $\frac{1}{3}$ of earlier values cited. *Subject Headings:* **1. Austausch coefficient 2. Eddy diffusivity 3. Turbulent exchange.**—*M.R.*

3.8–130 551.555.3:551.556:551.588.2(788)

Ives, Ronald L. (*Indiana Univ.*), **Frequency and physical effects of chinook winds in the Colorado High Plains region.** *Association of American Geographers, Annals*, 40(4):293–327,

Dec. 1950. tables, graphs, photos, refs. **DLC**—As a result of field, library and statistical investigations over the period 1930–1948 the author sums up the theoretical, statistical and synoptic aspects of chinook winds. The physics of chinook wind formation are explained and applied to the Colorado region with a geographical description of the area. A definition of chinook wind as opposed to ordinary warm westerlies is given and statistical data for the frequency of both are presented and compared. Effect of chinook winds on temperature, precipitation, static electricity, radio communication, etc. are mentioned. Paleoclimatological effects of chinook winds are pointed out. Good photographs show land and plant formation modified by chinook winds. Geographical, statistical and synoptic data are presented on maps, graphs and cross sections (note the error in interchanging fig. 10 and 11). *Subject Headings:* **1. Chinook theory 2. Chinook effects 3. Colorado.**—*G.T.*

3.8–131 551.555.9:551.509.317

McIntyre, D. P., **A technique for wind analysis and forecasting as applied to Victoria, British Columbia.** *Royal Meteorological Society, Quarterly Journal*, 78(336):247–254, April 1952. 10 figs., table, ref. **DWB**—The relation of observed and geostrophic winds is tabulated at 6 hr intervals and discussed. Features are: forenoon easterlies and seasonal variations of geostrophic and observed winds. The tables are then put into a form for forecasting observed wind at Victoria from forecast geostrophic wind. *Subject Headings:* **1. Wind variations 2. Wind forecasting 3. Victoria, British Columbia.**—*C.E.P.B.*

WIND EFFECTS

(*See also items:* 3.8–6, –7, –93, –125, –202, –204)

3.8–132 551.556:551.465(261.2)

Roll, Hans-Ulrich, **On the expansion of sea waves due to the effect of wind, based on measurements in shallow tidal waters.** *U. S. Beach Erosion Board, Bulletin*, 6(1):22–25, Jan. 1, 1952. graphs. Abstract of English translation of German original from *Deutsche Hydrographische Zeitschrift*, 2(6), 1949. **DWB**—Wind and wave measurements made in tidal waters of Neuwerk Shallows in North Sea at the mouth of the Elbe River are described and compared with theoretical results based on SVERDRUP and MUNK. Empirical relation between steepness and wave age shows wide scatter which may indicate the youngest waves assume a considerable increase in steepness immediately after formation. Influence of fetch on wave heights and age according to SVERDRUP and MUNK is compared with Neuwerk measurements and agreement indicates that Sverdrup-Munk theory of growth of sea waves due to wind is valid. *Subject Headings:* **1. Wind-wave relationships 2. Shallow water waves 3. Wave expansion 4. Translations 5. North Sea 6. Elbe Lightship, Germany. I. Sverdrup, Harold Ulrik II. Munk, Walter H.**—*M.R.*

3.8–133 551.556:551.46

Roll, Hans-Ulrich, **Wellenmessungen im Mündungsgebiet der Elbe.** [Wave measurements in the mouth of the Elbe.] *Deutsche Hydrographische Zeitschrift*, 4(4–6):172–174, 1951. table, ref. **DWB**—Tabulates and discusses a large number of observations at Neuwerk and Elbe Lightship, giving wind direction and velocity, depth of water, wave fetch, and direction, height, wave length, period and speed. The observations are very briefly discussed. *Subject Headings:* **1. Wave data 2. Wind effects 3. Elbe Lightship, Germany.**—*C.E.P.B.*

3.8–134 551.556:551.46

Roll, Hans-Ulrich, **Wie rasch entwickelt sich die Sturmsee?** [How quickly does a storm sea develop?] *Wetterlotse*, Hamburg, No. 35:1–6, Jan. 1952. fig. **DWB**—On 24–25 Aug. 1951, wave height at JIG increased from 5–12 m in 3 hours, in cold air behind a trough, and finally to 14 m. Author concludes that wave development is greater in cold than warm air of the same wind force. *Subject Headings:* **1. Wave heights 2. Wind waves. 3. Weather ship *JIG*.**—*C.E.P.B.*

3.8–135 551.558:551.46:532.59

Roll, Hans-Ulrich, **Vorausberechnung des Seeganges.** [Predetermination of swells.] *Umschau*, Frankfurt a.M., 50(22):697–698, Nov. 1950. 2 figs. **DLC**—Recent research on the

formation and growth of waves is summed up and its results are indicated. Two curves, prepared by SVERDRUP and MUNK for determining wave height and period as functions of wind speed and duration and distance covered by the wave, are presented. *Subject Headings:* **1. Swell 2. Wave heights 3. Wave formation.**—*G.T.*

AQUEOUS VAPOR AND HYDROMETEORS

CLOUD PHYSICS AND ICING

(See also items: 3.8–51, –144, –153)

3.8–136 551.574.1:537.531

Dorsch, Robert G. and Boyd, Bemrose. **X-ray diffraction study of the internal structure of supercooled water.** *U. S. NACA, Technical Note* 2552, Oct. 1951. 14 p. diagr., graph, photo, refs. DWB—X-ray diffraction data for water in the temperature range 21° to −10°C are presented. The minimum between the two main diffraction peaks deepened continuously as the temperature was lowered. It is concluded that supercooled water apparently becomes progressively more ice-like in structure as the temperature is lowered. *Subject Headings:* **1. Supercooled water 2. X-ray diffraction data for water 3. Ice formation.** *Author's abstract.*

3.8–137 551.574.1:551.509.67:548.5

Inn, Edward C. T., **Photolytic inactivation of ice-forming silver iodide nuclei.** *American Meteorological Society, Bulletin,* 32/4):132–136, April 1951. 6 refs. MH-BH Silver iodide crystals are decomposed photolytically by the action of light having wave lengths below 4300 Å. Photolysis is reversible when crystals are exposed to subdued light. Exposure of AgI nuclei to wave lengths, 4300 Å and less, of a quarts mercury arc light source for 10–20 minutes destroys their capacity to form ice particles when injected into a cloud of supercooled water droplets. Exposure of photolyzed AgI nuclei to subdued light in a darkened room either did not bring about complete recovery from photolysis or had no effect at all. It is suggested that the surface-structure-sensitive process of ice nucleation by AgI is destroyed when the entire surface layer has been decomposed photolytically. *Subject Headings:* **1. Photolytic decomposition 2. Condensation nuclei 3. Silver iodide.** *I.L.D.*

3.8–138 551.574.1

Palmer, H. P., **The reproduction of ice crystals by 'splintering.'** *Great Britain, Meteorological Research Committee, M.R.P.* 702, S.C. 111/120, 4th Feb. 1952. 8 p. 3 figs., 3 refs. Mimeographed. DWB—A layer of hoarfrost was formed by sublimation on under surface of a cooled block at 0 to −25°C from an airstream in a cloud chamber. When surface was 5° colder than air, hoarfrost grew dendritically and ice splinters were released [20 min.$^{-1}$cm.$^{-2}$], probably by fracture of dendrites. With difference less than 5°C, tabular plates were formed without splintering. Release of splinters during freezing of deposited water is also discussed. It occurs only with contaminated water. *Subject Heading:* **1. Ice crystals.**—*C.E.P.B.*

3.8–139 551.574.1:551.578.41

Weickmann, Helmut, **"Biologie" der Schneekristalle.** ["Biology" of snow crystals.] *Umschau,* Frankfurt a.M., 50/4):116–119, Feb. 1950. 12 figs. DLC Conditions affecting various forms of the growth of ice crystals are examined. The dependence on temperature of basic types of ice crystals is presented in a graph. Twelve pictures of crystals and replicas are presented. *Subject Heading:* **1. Ice crystal formation.**—*G.T.*

3.8–140 551.574.1

Yamamoto, Gi-ichi and Miura, Akira, **Saturation vapour pressure and size of condensation nucleus.** *Tohoku University, Science Reports, 5th Ser., Geophysics,* 3(1):34–39, April 1951. 5 figs., 5 tables, 8 refs., 13 equations. DWB Convenient approximate expressions are derived relating saturation vapor pressure and the size of a nucleus containing a given amount of solute. The effect of adsorption is not considered. *Subject Headings:* **1. Condensation nuclei 2. Saturation vapor pressure 3. Cloud physics 4. Japan.**—*A.A.*

3.8–141 551.574.1:551.578.41

Zamorskii, A. D., **Koaguliatsionnyi rost snezhinok.** [Growth of snowflakes by coalescence.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 24(86):60–79, 1951. 7 figs., 15 tables, 24 refs. DLC—This article consists of an extensive critical review of the literature and observational data collected by the author. The following topics are covered, viz.: the coagulation of snowflakes with cloud droplets, the shape and size of ice nuclei of snowflakes, the transition of crystals into grains, the incidence and properties of nucleated snowflakes and the process of the coalescence of snowflakes. *Subject Headings:* 1. Snowflake coalescence 2. Cloud physics 4. Snow crystal nuclei.—*I.L.D*

CLOUDS

(See also item: 3.8–22)

3.8–142 551.576.11:551.524:551.507.352

Chestnaia, I. I., **Izmenenie temperatury i vlazhnosti vozdukha pri perekhode iz kuchevogo oblaka v okruzhaiushchuiu ego atmosferu.** [Changes in the temperature and humidity of air during its passage from a cumulus cloud into the atmosphere surrounding it.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 24(86):5–19, 1951. 7 figs., 3 tables, 5 refs., equations. DLC—Measurements of temperature and humidity within cumulus clouds and in the surrounding atmosphere were made during airplane flights carried out in the summer of 1946–1948. It was found that the difference in temperature within a cloud and outside of it depends on the height above the cloud base, the humidity of surroundings of the cloud, the stage of the cloud and the presence of vertical currents. Relative humidity is difficult to measure because of inertia of the hygrometer. The reliability of the hygrometer and methods for eliminating errors are discussed. *Subject Headings:* 1. Cloud observations 2. Cumulus cloud temperatures 3. Relative humidity measurement 4. Airplane observations 5. Cloud height 6. Vertical currents 7. Hygrometers.—*I.L.D.*

3.8–143 551.576.11

Condensation trail over Delhi on 29 March 1951. *Indian Journal of Meteorology and Geophysics*, 2 3 :296, July 1951. photo. MH-BH—Description of a thick condensation trail, a rare occurrence in the tropics. *Subject Headings:* 1. Condensation trails 2. Tropics 3. Delhi, India.—*A.A.*

3.8–144 551.576.11:551.574.1

Růst ledových částic v kumulonimbech. [The growth of ice particles in cumulonimbus.] *Meteorologické Zprávy*, 4 5–6 :129, 1950. In Czech. MH-BH—Review of an article under the same title by F. H. Ludlam and R. Wexler, published in *Weather*, 5 7, July 1950 (*see* item No. 11 124 in Nov. 1950 *Meteorological Abstracts*). *Subject Headings:* 1. Cloud physics 2. Cumulonimbus clouds 3. Reviews. I. Ludlam, F. H. II. Wexler, Raymond.—*G.T.*

PRECIPITATION

(See also items: 3.8–34, –35, –39, –64, –110, –206)

3.8–145 551.577:621.396.9

Jones, R. F., **Aircraft observations of radar reflecting particles above the freezing level.** *Great Britain. Meteorological Research Committee. M.R.P.* 683, S.C. III 113, 16th. Nov. 1951. 12 p. 2 tables, 10 refs. Mimeographed. DWB—Observations of character of precipitation, temperature and icing on 8 flights in cloud in and above freezing level, in conjunction with ground radar, are discussed. Echoes from above freezing level are associated with numerous ice crystals ½ mm or more long, the bright band occurring at the change to raindrops. Other observations describe flights through Cu and CuNb above freezing level, with columnar echoes from supercooled water and usually icing. *Subject Headings:* 1. Radar precipitation echoes 2. Airplane observation.—*C.E.P.B.*

3.8–146 551.577

Yeh, Tu-cheng, Wallén, C. C. W. and Carson, J. E., **A study of rainfall over Oahu.** *Meteorological Monographs*, Boston, 3(1):34–46, June, **1951.** 11 figs., 7 tables, 8 refs. **MH-BH**—The surface pressure patterns near Hawaii have been classified into two anticyclonic situations, four purely cyclonic and two mixed situations. The dominant situation during the summer (90–97%) is a trade wind situation with a high pressure cell to the northeast of the Islands with northeast or southeast winds over Oahu. In the winter these situations occur in 40–45% of all cases. Special emphasis is given to the relation between rainfall and different synoptic types. The reasons for storm and drought days are examined. *Subject Headings:* **1. Precipitation studies 2. Synoptic types 3. Trade winds 4. Oahu, Hawaiian Islands 5. Hawaiian Islands.**—*A.A.*

3.8–147 551.577.35

Vagaries of the southwest monsoon 1950. *Indian Journal of Meteorology and Geophysics*, 2(2):96–100, April **1951.** 4 figs., tables. **MH-BH**—The SW monsoon of 1950 was characterized by a delay in the establishment of the Arabian Sea branch, by a spell of drought in Aug. and by heavy rains in various regions resulting in extensive floods. *Subject Headings:* **1. Monsoons 2. Precipitation variations.**—*I.L.D.*

3.8–148 551.577.37

Aniol, R., **Örtliche Unterschiede bei der Häufigkeit grosser Tagessummen des Niederschlags.** [Local differences in the frequency of large daily amounts of rainfall.] *Meteorologische Rundschau*, 5(1–2):18–19, Jan.–Feb. **1952.** fig., 5 tables, 3 refs. **MH-BH**—Frequencies of daily rainfalls of 10–20, 20–30 and 30–50 mm at 9 stations in Main and Saale valleys are tabulated, classified into 3 regional types, and discussed. *Subject Headings:* **1. Rain intensities 2. Germany.**—*C.E.P.B.*

3.8–149 551.577.37:551.577.31(54)

*Das, J. C., **On certain aspects of rainfall at Cherrapunji.** *Indian Journal of Meteorology and Geophysics*, 2(3):197–202, July **1951.** 5 tables. **MH-BH**—Hourly values of rainfall at Cherrapunji analyzed. Heaviest rainfall during the whole year and especially during the monsoon months falls in the early morning (on the average 4–5 times more than afternoon). In August 1946 the total rainfall from 0100 to 0700 IST was 30″ and from 1200 to 1800 only 3″. This characteristic feature is explained by the frontal interaction of two air masses. *Subject Headings:* **1. Rainfall extremes 2. Diurnal rainfall variations 3. Rainfall data 4. Monsoon rains 5. Cherrapunji, India.**—*A.A.*

3.8–150 551.577.37:551.577.61(588)

Obruchev, S. V., **Dva sluchaia katastroficheskikh livneĭ (Vostochnyĭ Pakistan i Vostochnyĭ Saian).** [Two instances of catastrophic rain storms (eastern Pakistan and eastern Sayan).] *Priroda*, Moscow, 40(11):56–57, **1951.** 4 refs. **DLC**—Descriptions of the severe rain storms which occurred June 10 to 19, 1950 in Darjeeling and of the damage caused, and of other cases of severe rainstorms which occurred in the 19th century; and of the rain storm of July 13–14 which occurred in the eastern Sayan. *Subject Headings:* **1. Rainstorms 2. Rainstorm damage 3. Pakistan 4. Sayan Mountains, U.S.S.R.**—*I.L.D.*

3.8–151 551.577.51:551.577.3(47)

Fel'dman, IA. I., **Nekotorye resul'taty po issledovaniiu vliianiia ravninnogo rel'efa na letnie osadki.** [Some results of research on the influence of plain relief on summer precipitation.] *Akademiia Nauk, SSSR, Institut Geografii, Trudy*, v. 48, Voprosy Klimatologii, **1950.** p. 103–109. table, 8 refs. **DLC**—The author establishes a positive correlation between rainfall and the degree of desiccation of the relief of plains. The ratio of the length of ravines, gullies and small river plains per square mile was calculated for European U.S.S.R. and, eliminating the effects of vegetation and of the general circulation, correlations were calculated between summer precipitation and established regions. The physical factors underlying the

various degrees of correlation are discussed and the effect of elevation is considered. *Subject Headings:* **1. Summer precipitation 2. Topographic effects 3. Precipitation variations 4. U.S.S.R.**—*I.L.D.*

3.8–152 551.578.11:551.573

Best, A. C., **The evaporation of raindrops.** *Royal Meteorological Society, Quarterly Journal*, 78(336):200–225, April **1952.** 13 figs., 13 tables, 10 refs., 48 equations. **DWB**—Change of surface area of a drop of radius 0.15 mm or more falling through z_m = const. $(1-f)^{1.13}$ exp $(-lz)$ where f = R.H./100; values of const. and l are given for ICAN and standard tropical atmospheres. For smaller drops, change of volume is proportional to $(1-f)^{1.062}$ exp $(-lz)$. Effects of evaporation on size distribution of drops falling through a constant atmosphere, and on the radar response, are examined. It is shown that with rain falling through air initially unsaturated, difference of temperature above steady state value, and of relative humidity below 100%, decrease exponentially to zero with time; values for different initial states and different rates of rainfall are calculated. Results agree with those of Dolezel (1944). *Subject Heading:* **1. Evaporation of raindrops.**—*C.E.P.B.*

3.8–153 551.578.11:551.509.67

Mason, B. J., **The physics of precipitation and the artificial production of rain.** *Advancement of Science*, London, 8(31):308–309, Dec. **1951.** **DLC**—Opens with a brief account of various mechanisms for natural production of rain—large droplets; ice crystals and supercooled droplets; falling ice crystals. Then describes artificial stimulation by ice crystals or AgI, and refers to limitations of methods. *Subject Headings:* **1. Artificial precipitation 2. Raindrop formation.**—*C.E.P.B.*

3.8–154 551.578.11:551.515.8

Takeuchi, Ushio and Nakazawa, Zenichi, **The relation between the chloride content of rain water and the airmass of central Honshu.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 29(3):96–100, March **1951.** 3 figs., table, 10 refs. In Japanese, English summary p. 100. **MH-BH**—Chloride content is greatest with air originating over the Pacific Ocean and least with that of continental origin. *Subject Headings:* **1. Rain composition 2. Air masses.**—*C.E.P.B.*

SNOW AND ICE

(*See also items:* 3.8–141, –144)

3.8–155 551.578.4:625.76(788)

Stewart, D. N., **Snow problems on Colorado highways.** *Western Snow Conference, Proceedings*, 17th Annual Meeting, April **1949.** p. 14–22. **DWB**—Problems arising in the winter maintenance of 4,000 miles of highways lying between 3,400 ft and 12,000 ft elevation (Loveland Pass). Sixteen mountain passes lie above 9,000 ft. Snowfall averages from 15 inches to 389 inches a year (7-year record), with a maximum winter fall of 808 inches at Wolf Creek Pass in 1936–1937. Since 1928–1929, one or more passes have been kept open all winter. Snowslides usually occur in February and March. *Subject Headings:* **1. Snow removal 2. Snowfall 3. Avalanches 4. Colorado.**—*M.R.*

3.8–156 551.578.46:551.508.26

Nechaev, I. N., **O metodike nabliudenii temperatury poverkhnosti snega.** [On the methodology of observation of temperature on snow surfaces.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 25(87):84–87, **1951.** 2 figs. **DLC**—Alcohol and mercury thermometers placed horizontally and half immersed in snow show high positive temperatures even when the air temperature is below zero. The author examines the reliability of snow surface temperatures attained by the exposure of these types of thermometers, examines the possibility of an exposure that will give reliable temperature and analyzes the causes of the high positive temperatures of the snow surface. *Subject Headings:* **1. Snow surface temperatures 2. Observation techniques.**—*I.L.D.*

3.8–157 551.578.46(431.7)

Reinhard, H., **Zur Kenntnis der Schneedeckenverhältnisse in Mecklenburg.** [On the snow cover conditions in Mecklenburg.] *Angewandte Meteorologie*, 1(4):114–119, Jan. **1952.** 4 figs., 5 refs. **DWB**—Charts of mean duration of snow cover (1891–1950) and mean number of days with snow, and histograms of mean depth of snow cover at Greifswald (1901–1948, all winters and severe winters) are shown and discussed. *Subject Headings:* **1. Snow cover 2. Mecklenburg, Germany.**—*C.E.P.B.*

3.8–158 551.578.7

Wichmann, Heinz, **Über das Vorkommen und Verhalten des Hagels in Gewitterwolken.** [On the origin and behavior of hail in thunderclouds.] *Annalen der Meteorologie*, 4(1–6):218–225, **1951.** 5 figs., 3 refs., 4 equations. German and English summaries p. 218. **MH-BH**—Aerological observations and flights through thunderclouds have given a new idea of the origin of hail. On basis of data from Cologne, author sets out a theory that precipitation is carried by a powerful narrow updraft to the region of wind shear near the summit of the cloud and then falls through a neighboring downdraft bounded on all sides by eddies. *Subject Headings:* **1. Hail formation 2. Cologne, Germany.**—*C.E.P.B.*

3.8–159 551.578.7

Lamoureux, C. E. (*W. B. Office, Des Moines, Ia.*), **Hail damage in Iowa, 1923–1948.** *Monthly Weather Review*, 80(3):37–44, March **1952.** 6 figs., 4 tables, 9 refs. **DWB**—In this paper, hail is treated as an economic rather than as a meteorological phenomenon. Statistics on hail frequency and damage are given for each county (99 of them) in Iowa and for the state, and frequencies tabulated in various ways (for each 1000 acres of cropland). Year by year damage is given from 1923–1948. Maximum annual hail damage per 1000 acres is plotted against number of acres of cropland in township, county, district and state, giving an enveloping curve (straight line on log/log paper) $y = 12.6(3.5)^{10-n}$ where $n = \log_{10} x$. Numerous accounts of individual hailstorms and damage therefrom (1863-1943) are cited. Several accounts told of hailstones 14 in. around and drifts 5–6 ft deep lasting 2 or 3 weeks in summer. *Subject Headings:* **1. Hail frequency 2. Hail damage 3. Iowa.**—*M.R.*

3.8–160 551.578.89

Henson, W. R., **A small insect enclosed in an atmospheric ice crystal.** *Nature*, London, 169(4288):40, Jan. 5, **1952.** **MH-BH**—May 4, 1951, needle-like ice crystals fell from a banner cloud in Alberta. One included a minute male chironomid. *Subject Headings:* **1. Insects 2. Ice crystals.**—*C.E.P.B.*

HYDROMETEOROLOGY

(*See also item:* 3.8–64)

3.8–161 551.579:551.45:06

Arid zone research. *Nature*, London, 169(4288):11–12, Jan. 5, **1952.** **MH-BH**—The work of the UNESCO Advisory Committee on Arid Zone Research established in 1951 is summarized. It is dealing first with underground water flow. *Subject Headings:* **1. Deserts 2. Hydrology 3. Arid zone research 4. UNESCO. Advisory Committee on Arid Zone Research.**—*C.E.P.B.*

3.8–162 551.579:626.8

Hiehle, Kurt, **Neuer Lebensraum für 100 Millionen Menschen.** [New living space for 100 million people.] *Umschau*, Frankfurt a.M., 50(4):105–108, Feb. **1950.** ref., map. **DLC**—The Davidov plan for directing the flow of the Siberian rivers Ob and Yeniseĭ into the Caspian sea, thereby modifying the climate of the now arid Aralo-Caspian plain, is discussed. Rough estimate of labor and cost involved is given and probable effect of the change is anticipated. The plan provides for the formation of a lake covering a territory of about 250,000 sq km and for construction of an artificial river bed over a distance of 930 km. The project is represented on a map. *Subject Headings:* **1. Irrigation 2. Climatic Amelioration 3. Hydrology 4. Ob River, U.S.S.R. 5. Yeniseĭ River, U.S.S.R. 6. Caspian Sea.**—*G.T.*

3.8–163 551.579(058) 551.506.1(569.4)
*Israel. Water Dept., Hydrological Service, **Hydrological year-book of Israel 1946/47.** Jerusalem, **1950.** 288 p. map, tables. In Hebrew and English. Price: LI. 3.500. **DWB**—River gage and water level observations at stations on rivers, in wadis and at springs in the two (western and eastern) drainage areas of Palestine; chemical analyses made in 1946 and 1947, annual precipitation and storm runoff, long period records of runoff; water level and chemical analyses for Lake Tiberias and the Dead Sea are tabulated by drainage basins. *Subject Headings:* **1. Runoff data 2. Hydrologic services 3. Precipitation 4. Yearbooks 5. Israel.**—*M.R.*

3.8–164 551.579.1
Bagrov, N. A., **Analiz obrazovaniia poter'.** [Analysis of the causes of water losses.] *Meteorologiia i Gidrologiia*, No. 1:48–51, Sept. **1950.** 3 refs., 2 refs., 15 equations. **DLC**—A mathematical analysis of the decrease of runoff depending on landlocked depressions in the river basin. The equations show that water losses are lower with higher amounts of precipitation. The conclusion of MRS. DMITRIEVA that with higher precipitation water losses also should be higher is incorrect. *Subject Headings:* **1. Runoff 2. Water losses.**—*N.T.Z.*

3.8–165 551.579.5:551.508.79
Stocker, O. and Kausch, W., **Bodenfeuchte und Tensiometermessung.** [Soil moisture and tensiometer measurements.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 32:15–18, **1952.** 4 figs. **DWB**—The physical properties measured by different soil moisture meters and physical significance of the measurements are not clearly understood. In this paper the Rogers tensiometer is examined. In the discussion H. WALTER suggests the use of the zero-method for determining the suction power of the soil. *Subject Headings:* **1. Soil moisture measurement 2. Soil moisture instruments. I. Walter, H.**—*A.A.*

3.8–166 551.579.5
*Uhlig, S., **Die Untersuchung und Darstellung der Bodenfeuchte.** [Investigation and determination of soil moisture.] *Germany. Deutscher Wetterdienst in der U. S. Zone, Berichte*, No. 30, **1951.** 30 p. 22 figs., 29 refs., append. **MH-BH**—Description given of general soil properties and soil moisture measurements, along with special problems of measurement and of calculation of soil moisture with different crops, and of soil moisture regulation. Results of observations at Heidelberg (mostly bare soil) for three years and at Geisenheim (different crops) are given. *Subject Headings*: **1. Soil moisture measurement 2. Heidelberg, Germany 3. Geisenheim, Germany.**—*A.A.*

3.8–167 551.579.5(52)
Yamanaka, K., **On the water content of soil of Owada in Kanto District.** *Journal of Meteorological Research*, Tokyo, 2(12):391–395, Dec. **1950.** 5 figs., 2 tables, 6 refs. In Japanese, English summary p. (12). **DWB** *Subject Headings:* **1. Soil moisture 2. Owado, Japan.**

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY OF PARTICULAR PLACES

(*See also items:* 3.8–40, –41, –98, –196)

3.8–168 551.582:551.589.1(4347)
*§Arnoux, J., **Éléments de climatologie des Pays Rhénans du Sud; Palatinat Rhenan, Bade, Sud Wurtemburg.** [Elements of climatology of the south Rhineland: The Palatinate, Baden, South Würtemberg.] [1948–49?] 185 p. charts, tables, bibliog. **DWB**—A detailed analysis of data and literature and an analytical discussion of geography, topography, general circulation and influence of orography on weather; temperature (mean, extreme and number of days $<0°C$), length of growing season, synoptic types resulting in cold or heat waves, freezing of Rhine (1822–1947); humidity, fog and haze (frequency and air masses or

winds responsible for fog and stratus at Lake Constance), frequency of fog at 7 airports, and at 35 other stations, unusual visibility and detailed data on frequency of visibility at 3 synoptic hours for a number of stations; synoptic conditions resulting in icing; surface winds, frequencies, local effects, wind roses, föhn winds; cloudiness, precipitation, snow, thunderstorm rainfall, frequency and synoptic conditions affecting upper air temperature, humidity and wind. *Subject Headings:* **1. Synoptic climatology 2. Upper air climatology 3. Visibility 4. Climate of the south Rhineland 5. Rhine Palatinate, Germany. I. France. Mission Météorologique Française en Allemagne et en Autriche.**—*M.R.*

3.8–169 551.582(45):626.8

Bernatzky, A., **Landgewinnung und Bodenvebesserung in Italien.** [Land reclamation and soil improvement in Italy.] *Umschau*, Frankfurt a.M., 52(8):228–230, 15 April **1952.** 5 figs., 5 refs. **DLC**—A summary account of swamping and erosion due to the climate and geological structure of Italy, and measures being taken to improve the soil. *Subject Headings:* **1. Soil conservation 2. Italy.**—*C.E.P.B.*

3.8–170 551.582(791)

Erickson, Carl R., **Arizona climate.** *Arizona Highways*, Phoenix, 28(3):3–7, 38–39, March **1952.** 6 photos by Allen C. Reed. **DWB**—The territory of Arizona is divided into three climatic regions; the northeastern high plateau, eroded canyons and valleys in the central belt, and deserts in the southwest. Climatic features of the region including temperature, pressure, upper air circulation, storms, precipitation, humidity and runoff are described and examples given. A table of temperature, precipitation and humidity data for 7 stations, taken from 3- to 70-year averages is presented. Photographs show characteristics of the different regions. *Subject Headings:* **1. Climate of Arizona 2. Climatic data 3. Arizona. I. Reed, Allen C.** (*photog.*).—*G.T.*

3.8–171 551.582:637(94)

Johnson, F. J., **The long wool industry.** *Western Australia. University. Dept. of Economics, Research Report* No. 18, Aug. **1950.** 13 p. tables, refs. Mimeographed. **MH-BH**—Section 4. "Topography and climate" includes brief comparison with Argentina. *Subject Headings:* **1. Industrial climatology 2. Western Australia.**

3.8–172 551.582:69(43)

Reidat, Rudolf, **Bauwesen und Wetterdienst.** [Architecture and weather service.] *Der Deutsche Holzbau*, No. 7/8, **1951.** 11 p. 12 figs. Abstracted from reprint. Foreword by Dr. Dammann. **DWB**—This discussion sets out the form in which climatic data in Germany are available to the architect, with examples mainly for Hamburg. Solar radiation on flat surfaces, walls and slopes of 30° and 60°, facing N, E, S, W, conversion of this radiant energy to heat, and losses by radiation and convection are set out. Effect of wind is discussed. Penetration of rain into walls is considered with precipitation wind rose; heat insulation by fresh and compacted snow, and penetration of cold and humidity into various building materials are described with diagrams. *Subject Headings:* **1. Building design 2. Building materials 3. Climatic influences. I. Dammann, Walter.**—*C.E.P.B.*

3.8–173 551.582(43):656.7

*Rocznik, Karl (*Regensburg*), **Das Flugwetter in Regensburg 1946 bis 1950.** [Flying weather in Regensburg 1946–50.] *Meteorologische Rundschau*, 5(1/2):17–18, Jan.–Feb. **1952.** 2 figs., table. **MH-BH**—Hourly observations of good and bad visibility, clear sky, low cloud and precipitation duration are tabulated by months. *Subject Headings:* **1. Flying weather 2. Airways data 3. Regensburg, Germany.**—*C.E.P.B.*

3.8–174 551.582:551.506.3(481/7)

Sauzéat, M. (*Ag. Lab. at Béziers*), **Le climat de Béziers; contribution à l'étude du climat de l'Hérault.** [The climate of Béziers; a contribution to the study of the climate of Hérault.] *Société Languedocienne de Géographie, Montpellier Bulletin, 2nd Ser.*, 22(1):157–175, Jan.–

June, 1951. fig., 8 tables. **DLC**—Based on 25 years of record (1922–1948), brief tables are presented for the various climatic elements affecting Beziers: temperature, hot and cold periods, frost, rainfall, cloudiness, fog, drought, etc. Summers are dry, fall and spring, wet. East winds bring rain and west winds, fair weather. The climate is essentially Mediterranean, modified by strong westerly circulation which prevents extremes of temperature, snow and fog, but makes rainfall quite variable from season to season. *Subject Headings:* **1. Climate of Béziers 2. Long period records 3. Béziers, France.**—*M.R.*

3.8–175 551.582(47)

Baranov, A. I., **Klimaticheskie vremena goda v Evropeĭskoĭ chasti SSSR.** [Climatic seasons in European U.S.S.R.] *Akademiia Nauk, SSSR, Institut Geografii, Trudy*, v. 48, Voprosy Klimatologii, **1950.** p. 32–48. 11 figs., table, 8 refs. **DLC**—The inadequacy of the determination of seasons by astronomical and arbitrary air temperature parameters is discussed. More suitable criteria are climatic characteristics which depend upon the types of local weather and which are determined by the radiation balance between the earth's surface and the lower atmosphere, by circulation conditions and by physical geographic factors. The application of this approach to the climate of European Russia is presented and maps showing seasonal duration and beginning of the seasons are given. *Subject Headings:* **1. Climatic seasons 2. European U.S.S.R.**—*I.L.D.*

3.8–176 551.582(4438)

Godard, Alain, **Contribution à l'étude du climat Lorrain.** [Contribution to the study of the climate of Lorraine.] *Revue de Géographie de Lyon*, 26(3):297–310, **1951.** charts, diagrs., refs. Stamped on cover title: *Nancy. Université, Institut de Géographie, Travaux*, No. B4. **DWB**—Region is described; a brief resume of sunshine duration and temperature, precipitation in relation to wind direction (Nancy 1881–93), pluviometric coefficient (1851–1930 at Metz), types of weather based on air mass movements, local climates and microclimates are presented. An isohyetal chart and a rainfall type chart are also included. This area receives less than 40% of the possible sunshine. Even when pressure is high it is more often cloudy than clear. *Subject Headings:* **1. Climate of Lorraine 2. Lorraine, France.**—*M.R.*

3.8–177 551.582(94)

*Johnson, F. R., **Land utilization in the Southern Cross-Corinthian-Bullfinch District in W.A.** *Western Australia University. Geographical Laboratory, Research Report* No. 25, May **1951.** 15 p. tables, refs. **DWB**—Chap. 2 of this report (pages 2–4) gives a general climatic description of the district under review, tables of average rainfall data from 60-year records and monthly mean temperature data representing 38-year averages. *Subject Headings:* **1. Climatic data 2. Land utilization 3. Western Australia.**—*G.T.*

3.8–178 551.582:016(57)

†U. S. Weather Bureau, **Climate of Siberia; selected list of references.** [n.d.] 3 p. **DWB**—A list of 17 references to material contained in the U. S. Weather Bureau Library. The earliest reference is to a work by Middendorff (1861) and the latest to an item printed in 1932. Brief annotations. *Subject Headings:* **1. Climate of Siberia 2. Bibliographies 3. Siberia, U.S.S.R.**

3.8–179 551.582.2(752)

*Brancato, George N., **The climate of Washington County.** (In: Maryland. Dept. of Geology, Mines and Water Resources, **The physical features of Washington County. 1951.** p. 254–256. tables.) **DWB**—A list of weather stations in this county is given with periods of record for each and names of observers. Brief summaries of temperature, rainfall, growing season, fog, wind, sunshine and cloudiness conditions in the county are supplemented by tables showing average and extreme monthly and annual data for each of these elements. The discussion is written from the point of view of the synoptic meteorologist but is not highly technical. *Subject Headings*: **1. Climate of Washington County, Maryland 2. Washington County, Maryland.**—*M.R.*

CLIMATIC VARIATIONS

3.8–180 551.583:598.2

Moreau, R. E., **Africa since the Mesozoic: with particular reference to certain biological problems.** *Zoological Society of London, Proceedings*, 121(4):869–913, Feb. 8, **1952.** fig., 4 tables, numerous refs.—A study of the geological and climatic changes in Africa since the Eocene in connection with the distribution of birds. Existing and geological climates are discussed on p. 877–886. Possibilities of continental drift, and of movements of the thermal equator due to astronomical causes are regarded rather unfavorably, but climatic zones have varied in width and there have been great fluctuations of rainfall. *Subject Headings:* **1. Biogeography 2. Climatic variations 3. Africa.**—*C.E.P.B.*

3.8–181 551.583:598.2

Seilkopf, Heinrich, **Änderungen des Klimas und der Avifauna in Mitteleuropa.** [Changes of climate and birdlife in Middle Europe.] *Beiträge zur Naturkunde Niedersachsens*, 4(4), **1951.** 14 p. table, graphs, 22 refs. **DWB**—Author defines climate from point of view of ecology of animals and discusses climatic oscillations as shown by long series of meteorological observations. Examples are temperatures at Prague 1775–1939 and Utrecht 1741–1940, severity of winter and heat of summer at Berlin and Vienna, precipitation at Utrecht, etc. Indicators of historical climate are discussed and changes in ranges of bird species described in detail; these agree closely with climatic changes. *Subject Headings:* **1. Biogeography 2. Climatic variations.**—*C.E.P.B.*

3.8–182 551.583.15(92):551.513.7

Schmidt-Ten Hoopen, Mrs. K. J. and Schmidt, F. H., **On climatic variations in Indonesia.** *Indonesia. Djawatan Meteorologi dan Geofisik, Verhandelingen*, No. 21, [n.d.] 43 p. 34 figs., 2 tables, 11 refs. **DWB**—The considerable climatic variations at Jacarta (Batavia) since 1871 are shown by curves for each month, smoothed over 11 years, of mean, maximum and minimum temperature, wet bulb, pressure, sunshine and rainfall, also annual raindays. The study of rainfall is extended to all East Indies, northern and southern groups of stations being distinguished which vary oppositely. This is attributed to variations in position of Intertropical Convergence Zone, unstable moist air from north penetrating south to a distance governed by pressure over E. Asia, and to a less extent N. Australia. Numerous correlation coefficients are given. *Subject Headings:* **1. Climatic variations 2. Correlation coefficients 3. Atmospheric circulation 4. East Indies.**—*C.E.P.B.*

3.8–183 551.583.3(566)

*Gabrielian, G. K., **Sledy drevnego oledeneniia v severo-zapadnoĭ Armenii.** [Traces of ancient glaciation in northwestern Armenia.] *Priroda*, Moscow, 40(1):57–59, Jan. **1951.** fig., 7 refs. **DLC**—A discussion of the controversial question of the time of glaciation of the mountain range of northwest Armenia. Some fragmentary data on meteorological conditions of this region (precipitation, temperature, soil temperature, frozen ground, etc.) are included. *Subject Headings:* **1. Fragmentary climatic data 2. Glaciation 3. Quaternary climates 4. Armenia.**—*C.K.*

3.8–184 551.583.3

Gripp, K. and Schutrumpf, R., **Über den morphologischen Nachweis einer nacheiszeitlichen Klimaschwankung.** [On the morphological evidence for a post-glacial oscillation of climate.] *Naturwissenschaften*, 39(5):110, March **1952.** **DWB**—Terraces in lake basins in Holstein, formed by melting of buried ice, indicate a long period of stable water level which is attributed to a cold period following the Allerod oscillation (Younger Dryas period). *Subject Heading:* **1. Climatic variations.**—*C.E.P.B.*

3.8–185 551.583.7

Kerr, D. P. (*Univ. of Toronto, Dept. of Geography*), **Methods in paleoclimatology with reference to Canada.** *Royal Meteorological Society, Canadian Branch*, [*Publications*], 2(7):1–7, **1951.** 14 refs. **DWB**—Brief account of nature of evidence for past climates and summary of geological climates of Canada. *Subject Headings:* **1. Paleoclimatology 2. Canada.**

MICROCLIMATOLOGY

(*See also item:* 3.8–200)

3.8–186 551.584(52)

*Aoki, S., **Micro-climatic investigations in the Shōgozo of Shōsoin.** *Journal of Meteorological Research*, Tokyo, 3(6):207–214, March **1951.** 4 figs., 2 tables. In Japanese, English summary p. (14). **DWB**—Data on wind speed and direction and on temperature are given. *Subject Headings:* **1. Microclimatology 2. Climatic data 3. Shosoin, Japan.**

3.8–187 551.584

Borushko, I. S., **O podobii profileĭ meteorologicheskikh elementov v prizemnom sloe vozdukha.** [Similarities of the profiles of the meteorological elements in the atmospheric layer near the ground.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 22 (84):55–58, **1950.** 4 figs., tables, 4 refs., 3 equations. **DLC**—The experimental data on the vertical distribution of wind velocity, temperature and humidity at elevations 0.25 m to 2 m, given by F. Pasquill (*see item* No. K–173 in Nov. 1950 *Meteorological Abstracts*) are analyzed in order to determine the existence of similarities in the profiles of these elements. Equations describing the profiles of the elements (developed by Laĭkhtman) are given. The author shows that the profiles of wind, temperature and humidity are similar during the day, and their curves are determined by the same parameter. *Subject Headings:* **1. Micrometeorology 2. Profiles of meteorological elements.**—*I.L.D.*

3.8–188 551.584

Mallik, A. K., **The control of the micro-climate for given practical purposes.** *Indian Journal of Meteorology and Geophysics*, 2(3):165–171, July **1951.** 3 figs., 5 tables, 10 refs. **MH-BH**—Experiments made at Poona on the control of soil temperature by changing the surface color and by growing vegetation are described. The effect of surface color is most marked at 1400 IST. The surface temperature of dark soil can be lowered 14°C by covering the surface with a thin layer of white powder like French chalk, and can be considerably increased by the application of a thin layer of black powder like charcoal. The maturation of cotton can be hastened several weeks by using black powder. Evaporation from black surfaces is twice that from white surfaces. Methods of controlling air temperature during cold waves to reduce frost damage of crops are described. The drought resistance of crop plants can be tested by artificial production of microclimate and by comparing the transpiration ratio with the evaporation ratio. *Subject Headings:* **1. Microclimate control 2. Surface temperatures 3. Frost prevention 4. Evapotranspiration 5. India.**—*A.A.*

3.8–189 551.584.61

Bingham, E. W., **A greenhouse in the Antarctic.** *Polar Record*, 6(43):392–393, Jan. **1952.** 2 photos. **MH-BH**—Account of a successful greenhouse on Stonington Island, 68°7′S. *Subject Headings:* **1. Indoor climates 2. Stonington Island, Antarctica.**

CLIMATIC CLASSIFICATION

(*See also item:* 3.8–197)

3.8–190 551.585:551.311

Cholley, A., **Morphologie structurale et morphologie climatique.** [Structural morphology and climatic morphology.] *Annales de Géographie*, 59(317):321–335, Nov.–Dec. **1951.** refs. **DLC**—A general discussion of the geological structures and the systems or types of erosion which are found in various climatic regions. The effect of rainfall types for instance, on erosion in the various river basins of the world is not uniform. In the "erosion cycle" it is wrong to consider the processes at any time as working towards a certain end but that each moment is an "end" in itself and should be studied as a part of the cycle of evolution or degradation. *Subject Headings:* **1. Climatic regions 2. Erosion 3. Geomorphology.**—*M.R.*

3.8–191 551.585:551.4

Büdel, Julius, **Das System der klimatischen Morphologie. Beiträge zur Geomorphologie der Klimazonen und Vorzeitklima (V).** [The system of climatic morphology. Contributions to geomorphology of climatic zones and former climates V.] *Deutscher Geographentag*, Munich, 27(4), **1948.** p. 65–100. 2 figs., 70 refs.—Land forms are classified and described according to their relations to present day climates. The effects of past glaciation are discussed. The distribution of 16 land forms from glacial zone to inner tropical earths is mapped. *Subject Headings:* **1. Climatic classification 2. Land surfaces.**—*C.E.P.B.*

BIOCLIMATOLOGY—APPLIED CLIMATOLOGY

(*See also items:* 3.8–29, –90)

3.8–192 551.586:599.9

Dammann, Walter, **Klima und Energieentfaltung der Völker.** [Climate and energy of peoples.] *Annalen der Meteorologie, Medizin-meteorologische Hefte*, No. 6:38–48, **1951.** 10 figs. **DWB**—A summary of literature on comfort, working efficiency, and sultriness in relation to weather and climate. World climatic energy is shown according to S. Markham and E. Huntington and related to deaths by diabetes (Europe, A. Missenard). Historical displacements of civilization centers are discussed in light of climatic cycles. Finally, a brief reference is made to possibilities of artificial control. *Subject Headings:* **1. Comfort zones 2. Climatic effects 3. Climatic variations.**—*C.E.P.B.*

3.8–193 551.586:612(798)

Washington. University, Seattle, Washington, **Report of studies on acclimatization, winter 1948–1949.** Contract AF33/038.–422, [Report] Aug. **1949.** 27 p. diagrs., graphs, bibliog. *U. S. Air Force, AF Technical Report.* **DWB**—Report on experiments made at Ladd Field, Fairbanks, Alaska with instruments developed at the Dept. of Physiology and Biophysics, Univ. of Washington. Expired air was analyzed, skin and body temperature, rate of heat loss and heart rate recorded under changing temperature and working conditions. Schematic drawings of the instruments used and data arranged in tables and graphs are presented. *Subject Headings:* **1. Acclimatization 2. Human ecology 3. Alaska. I. Carlson, L. D. II. Burns, H. L. III. Quinton, W. E. IV. Bark, R. S. V. Contract AF33/038-422.**—*G.T.*

3.8–194 551.586:612:551.508.98(54)

Murgai, M. P., **Measurement of human comfort.** *Science and Culture*, Calcutta, 16(12): 543–545, June **1951.** refs. **DWB, DLC**—The author discusses the measurement of human comfort as determined by the heat interchange between the body and its environment by means of dry bulb temperature, by the use of the katathermometer, by atmospheric humidity and by the mean radiation of the surroundings. The principle and use of the katathermometer and its construction are described; the significance of radiant temperature and the use of the corrected effective temperature are considered. It was found that Indian subjects were comfortably cool at a corrected effective temperature of 71°F, comfortable up to 79°F, uncomfortable above 80°F. *Subject Headings:* **1. Physiological climatology 2. Heat effects on man 3. Human ecology 4. Katathermometers 5. India.**—*I.L.D.*

3.8–195 551.586:612:016(04)

†Berke, Jacqueline and Wilson, Vivian, **Watch out for the weather.** New York, Viking Press, **1951.** 226 p. biblio. p. 215–218. **DWB**—Popular book on physiological influences of weather and climate. The influence of temperature, pressure, air pollution, solar radiation, etc. on normal and pathological functions of the human body is discussed. Reference is made to laboratory tests in which the behavior of animals under different, artificially created climatic conditions is investigated. Possibilities of changing weather and climate are considered, and Schaefer's and Langmuir's cloud seeding experiments described. Attention is given to the general rise in mean temperature during the last century. A bibliography containing 54 pertinent entries is included. *Subject Headings:* **1. Popular meteorology 2. Medical meteorology 3. Bibliographies.**—*G.T.*

3.8–196 551.586:615.9:551.582.1(438)

*Skibniewski, Leonard, **Wpływ morza i klimatu morskiego na organizm człowieka.** [Influence of the sea and sea climate upon the human organism.] *Gazeta Obserwatora PIHM*, Warsaw, 3(9):5–7, Sept. 1950. 4 tables, 2 refs. **DLC**—General information on the physiography and climate of the Polish part of the Baltic Sea shore line from the point of view of its salubrity. *Subject Headings:* **1. Seaside resorts 2. Baltic Sea coast 3. Poland.**—*A.M.P.*

3.8–197 551.586:616:612:551.585.7

†Loewy, Adolf and Wittkower, Erich, **The pathology of high altitude climate, with contributions to the climatology of highland regions and to the constitution of high altitude inhabitants.** London, Oxford Univ. Press, **1937.** 212 p. tables, graphs, diagrs., refs. Oxford Medical Publications. **DLC**—The authors review the literature on the diseases that occur in high altitude regions, their special characteristics, distribution and their course. The six chapters comprising the book are as follows: 1) the pecularities of the climate of high altitudes; 2) the effect of high altitude upon the constitution of the inhabitants (the circulatory system, the respiratory system, the autonomic nervous system and various physical and mental characteristics); 3) diseases occurring at high altitudes—infectious, non-infectious and specific mountain diseases; 4) the mortality in individual mountain regions; 5) temporary disturbances produced by mountain climates and 6) the curative effect of mountain climates. A bibliography is given for each individual chapter. *Subject Headings:* **1. Pathology 2. High altitude climates 3. Physiological climatology 4. Medical meteorology.**—*I.L.D.*

3.8–198 551.586:616:551.510.41

San Román y Rouyer, José de, **Meteorología y climatología en la salud y en la enfermedad.** [Meteorology and climatology in health and sickness.] *Revista de Geofisica*, 10(39):214–233, July–Sept. **1951.** 4 figs. **DWB**—A fairly lengthy review of the theories of Dr. Manfred Curry on the prevalence of "aran" and its effect on human beings. The author thinks that the oxidizing power of air (whether of oxygen, ozone, or aran) is the parameter to be studied, and presents several tables to show diseases that are affected by presence or absence of this factor, the atmospheric elements which affect human beings, those which are correlated with high (or low) oxidizing power, places in Europe, America and Spain which are high or low in such power, and the detailed effects of high or low aran content on normal human activity or disease. *Subject Headings:* **1. Medical meteorology 2. Medical climatology 3. Aran 4. Ozone. I. Curry, Manfred.**—*M.R.*

3.8–199 551.586:634.9:551.521.1:551.525.2(746)

Smith, David M., **The influence of seedbed conditions on the regeneration of eastern white pine.** *Connecticut. Agricultural Experiment Station, Bulletin* 545, Feb. **1951.** 61 p. photos., diagrs., graphs, tables, refs. **DLC**—Detailed observations were carried out on sandy soils in northwestern Connecticut to determine why certain types of surface materials induced significant variations in the abundance of seedlings of *Pinus Strobus L.* It was found that these differences were important only where the seedbeds were exposed to direct solar radiation. Those composed of pine litter, dry mineral soil and lichens proved to be highly unfavorable because of physical characteristics not conductive to rapid dissipation of heat. The resultant extreme surface temperatures caused extreme desiccation unfavorable to germination and heavy losses of first-year seedlings from heat injury. Seedbeds of *Polytrichum* moss and moist mineral soil lose heat rapidly enough to prevent lethal temperatures and are favorable to pine seedlings. A physical explanation of these microclimatic differences is proposed. Suggestions are made for overcoming these difficulties by scarifying or shading the forest floor and carrying out cuttings aimed at allowing a maximum of diffuse radiation and a minimum of direct radiation to reach the forest floor. *Subject Headings:* **1. Forest seedbeds 2. Radiation effects 3. Soil surface temperatures 4. Eastern white pine 5. Connecticut.**—*Author's abstract.*

3.8–200 551.586:636:551.584.61

Radiomska, Maria J., **Badania nad mikroklimatem budynków inwentarskich i jego znaczenie w hodowli i chowie zwierzat domowych.** [Investigations of the microclimate of

livestock buildings and its importance in the rearing and breeding of domestic animals.] *Gazeta Obserwatora PIHM*, Warsaw, 3(9):10–13, Sept. 1950. **DLC**—In Poland, livestock and poultry pass a large part of the year indoors. After having stressed the importance of good and healthy conditions (of the barn microclimate), the author determines optimum conditions specifically for different kinds of animals. *Subject Headings:* **1. Animal husbandry 2. Microclimatology 3. Building climates.**—*A.M.P.*

3.8–201 551.586:636

Ray, D. K., **Relation of temperature to the sporulation of coccidian oocysts of Indian sheep and goat.** *Science and Culture*, Calcutta, 17(5):220–221, Nov. 1951. ref. **MH-BH**—Summarizes observations of oocysts in faeces kept at 32° or 38.5°C for 10–25 hours. *Subject Heading:* **1. Bioclimatology.**—*C.E.P.B.*

UPPER AIR CLIMATOLOGY

3.8–202 551.587:551.513.2:551.553.2:551.515.8

§Thompson, B. W., **An essay on the general circulation of the atmosphere over southeast Asia and the west Pacific.** *Royal Meteorological Society, Quarterly Journal*, 77(334):569–597, Oct. 1951. 25 figs., 15 refs. **MH-BH**—An analysis of the daily flow charts and convergence zones for 2,000 and 10,000 ft prepared at Hong Kong for area Japan to equator, 100–150°E. Charts for winter (Nov.–March) illustrate usual dominance of Siberian air overlain by upper westerlies, N.E. monsoon surges over China and troughs in the upper westerlies associated with the active upper W. Pacific polar front. May is a complex transition month with new developments in the south. June and July represent the full summer monsoon; discussion includes N. Indian Ocean and equatorial westerlies and equatorial clockwise eddies, the latter forming the ITC front, a new theory of which is presented. In September the polar front moves south again. *Subject Headings:* **1. Atmospheric circulation 2. Polar fronts 3. Intertropic convergence zone 4. Southeast Asia 5. Western Pacific.**—*C.E.P.B.*

3.8–203 551.587.7

*Steinhauser, Ferdinand, **Ein Beitrag zur Kenntnis der Bergatmosphäre des Hochgebirges der Ostalpen. (Nach einem Vergleich fünfzigjähriger gleichzeitiger Beobachtungen vom Sonnblick, 3106 m. und von der Zugspitze, 2962 m.)** [A contribution to knowledge of the mountain atmosphere of the high mountains of the eastern Alps. (From a comparison of 50-year synchronous observations at Sonnblick, 3106 m and Zugspitze, 2962 m.)] *Zeitschrift für Meteorologie*, 5(7–8):204–212, July–Aug. 1951. 2 figs., 6 tables, 6 refs. **MH-BH**—A comparison of the climates of Central Alps (Sonnblick) and the northern margin (Zugspitze). Table 1 gives for 1900–1949 for both stations mean and extreme temperatures, cloud, sunshine, fog, precipitation, thunder and wind force. Most noteworthy are the lower temperature maxima on Sonnblick. The causes of differences in these elements (and humidity) are discussed. Five-day mean curves of cloud amount and precipitation are included. *Subject Headings:* **1. Mountain meteorology 2. Austrian Alps.** *C.E.P.B.*

INFLUENCE OF ENVIRONMENT

(*See also item:* 3.8–218)

3.8–204 551.588:551.585.53:551.555.8(5)

Fel'dman, IA. I., **Rol' oazisov i pustyn' Sredneĭ Azii v formirovanii mestnoĭ pogody s sukhoveem.** [The role of oases and deserts of central Asia in the formation of local weather with dry winds.] *Akademiia Nauk, SSSR, Institut Geografii, Trudy*, v. 48, Voprosy Klimatologii, 1950. p. 96–102. fig., 3 tables, 11 refs. **DLC**—The various types of weather with dry winds occurring in central Asia are described in terms of Fedorov's classification which is based upon air temperature and relative humidity, and the physical climatic factors underlying these types and their frequency in oases and in deserts are discussed. The effect of oases upon the frequency of weather types with dry winds of varying degrees of severity and the importance of local conditions over against general circulation conditions on their formation are

considered. *Subject Headings:* **1. Climatic regions 2. Desert climates 3. Oases 4. Dry winds 5. Central Asia.**—*I.L.D.*

3.8–205 551.588.1

Holm, Karl-Friedrich, **Die Änderung der thermischen Kontinentalität in den Jahren 1911 bis 1930.** [The change of thermal continentality in the years 1911–1930.] *Meteorologische Rundschau*, 4(9 10):178–179, Sept.–Oct. 1951. fig., 4 tables, refs. **MH-BH**—Author discusses various formulas for thermal continentality and selects GORCZYNSKI's $k = A/\sin\phi$. On this basis, he calculates decrease of k at German stations. Decrease is less with increasing height and latitude and partly from W to E. *Subject Headings:* **1. Continentality 2. Germany.**—*C.E.P.B.*

3.8–206 551.588.6:551.577.3(676)

Davies, D. A., **Report on effect on local rainfall likely to follow the replacement of forest area of the West Mau Reserve by tea plantations.** *East Africa High Commission. Meteorological Department, Memoirs*, 2(7), **1950.** 5+p. tables, diagr. **DWB**—The rainfall of Kenya is divided into four types depending on its mode of origin. The general effects of forests upon rainfall and upon individual types of rainfall are discussed. It is concluded that there is no scientific justification for the belief that the removal of 12,000 acres of forest in the West Mau Forest Reserve in East Africa and its replacement by tea plantations will influence the rainfall in an adjoining tea plantation. Monthly rainfalls for the Kericho area are given. *Subject Headings:* **1. Rainfall types 2. Forest rainfall 3. East Africa.**—*I.L.D.*

3.8–207 551.588.6:551.524.3:551.501.9:551.508.27

Floyd, P. M., Jr. (*Seabrook, N. J., Lab. of Climatology*), **The effect of natural shading on temperature measurements.** *Weatherwise*, 5(1):16–17, Feb., **1952.** 4 figs. **DWB**—For 21 months (July 1949–Mar. 1951) comparative temperature readings were made in two instrument shelters located in the yard of a cooperative observer at Bridgeton, N. J., in order to determine whether or not a positive temperature anomaly at that station (the oldest in the Johns Hopkins microclimatic network) was due to exposure or to local climatic pecularities. It was found that mean temperatures in the new shelter (in an open exposure) were usually higher (average +0.6°F) than in the older shaded exposure. The daily range was also much greater; maximum temperatures differed more than minimum; differences were greater in clear weather, and in Aug. and Sept. than under alternative conditions. Therefore it was decided that the anomaly in the 21-year record was real and not due to exposure. *Subject Headings:* **1. Instrument shelters 2. Shade temperatures 3. Instrument exposure 4. Bridgeton, N. J.**—*M.R.*

SYNOPTIC CLIMATOLOGY

(*See also items:* 3.8–98, –168)

3.8–208 551.589.1(744)

†*Karapiperis, Photios P., **The climate of Blue Hill according to air masses and winds.** *Harvard Meteorological Studies*, No. 9, **1951.** 76 p. tables, graphs, 100 refs. **MH-BH**—A scholarly and analytical study of air masses and winds and their effect on weather during each of the four seasons at Blue Hill, Mass. First the concept of air-mass climatology and its application in Europe and America are discussed. Then the similar concept of wind (air flow) climatology is considered. Local seasonal effects on general circulation and frequency of winds of the several directions and speed categories and resulting frequency of weather (temperature, relative humidity, cloud, fog, precipitation, snow, rain and visibility) each taken up separately and in detail, with tabular and graphic presentation of frequencies, are presented and discussed. A good 7-page bibliography includes many references on airmass climatology as well as on the climate of the Blue Hill region. (Part of this study is included in *item* 3E–234 in May 1952 *Meteorological Abstracts*.) *Subject Headings:* **1. Air mass climatology 2. Climate of Blue Hill 3. Blue Hill, Massachusetts.**—*M.R.*

3.8–209 551.589.1

Kats, A. L., **Izmenenie napravlennosti perenosa vozdushnykh mass v troposfere pri smene estestvennykh sinopticheskikh periodov.** [On the changes in direction of movement of air masses in the trophosphere during the transition between natural synoptic periods.] *Meteorologiia i Gidrologiia*, No. 4:24–30, Dec. **1950.** 4 tables, 3 refs. **DLC**—Results of a study of these changes made on the basis of analyses of synoptic material for the period Jan.–Dec. 1949, during which synoptic processes of the European region were split into 60 natural synoptic periods, are presented. They show: 1) a stability of the baric field in the lower half of the atmosphere, 2) a continuous evolutionary development of the field within each period and 3) a progressive alteration of the direction of air mass movement in the troposphere during the renewal of natural synoptic periods. Correlations are made from data on the relative topography of 500/1000 mb surfaces, the heights of the 500 mb surface, etc. *Subject Headings:* **1. Synoptic climatology 2. Air mass movements 3. Natural synoptic periods 4. Differential kinematics 5. Relative topography 6. U.S.S.R.**—*A.M.P.*

3.8–210 551.589.1

Kats, A. L. and Semenov, V. G., **O prodolzhitel'nosti estestvennykh sinopticheskikh periodov za 1938–1948 gg.** [On the duration of natural synoptic periods from 1938–1948.] *Meteorologiia i Gidrologiia*, No. 3:29–33, Nov. **1950.** 4 refs. **DLC**—Multanovskiĭ's concept of natural synoptic period and Pogava's more precise definition of this concept are discussed. Pogava defines a synoptic period as "an interval of time during which fundamental thermobaric fields are maintained in the troposphere; these fields are responsible for the specific direction of movement of pressure formations and for the maintenance of the geographic distribution of the centers of pressure fields over a natural synoptic region." The frequencies of various durations of natural synoptic periods over the interval 1938–1949 are presented. The mean duration of 663 natural synoptic periods was 6 days. *Subject Headings:* **1. Natural synoptic periods 2. Atmospheric circulation 3. Synoptic climatology 4. Long range forecasting.**—*I.L.D.*

3.8–211 551.589.1(43)

§Moritz, Gerd, **Stau- und Lee-Erscheinungen in den nordwestdeutschen Mittelgebirgen.** [Upslope and lee phenomena in the northwest German hill country.] Berlin, Hans Triltsch, **1940.** 62 p. 29 figs., 12 refs. **DLC**—The effect of orography on sunshine, cloudiness and precipitation under various types of air masses or air flow in the area of the German hill country is analyzed in great detail from the synoptic point of view. Local orographic effects on cloudiness are specifically mentioned and charted for various air-flow types. Local rainfall variations with varying degrees of upslope or föhn circulation are depicted in various ways. *Subject Headings:* **1. Upslope phenomena 2. Lee effects 3. Synoptic climatology 4. Germany.** —*M.R.*

MISCELLANEOUS APPLICATIONS

SOLAR INFLUENCES

(*See also item:* 3.8–78)

3.8–212 551.590.21:523.74

Craig, Richard A., **Solar variability and meteorological anomalies.** *American Academy of Arts and Sciences, Proceedings*, 79(4):280–290, July **1951.** table, 10 refs. **DWB**—Author summarizes the present status of the problem of the relationship of irregular variations in solar energy to irregular variations in the weather. The discussion covers the correlation of annual mean sunspot number with surface pressure, temperature and precipitation (Walker); mean pressure centered at three-year sunspot minimum with mean pressure centered at three-year sunspot maximum (Hanzlik); and short period solar variations with meteorological variables (Abbot, Duell, Harvard College Observatory). *Subject Headings:* **1. Sunspot effects 2. Pressure 3. Temperature 4. Precipitation.**—*I.L.D.*

3.8–213 551.590.21:550.385

Denisse, Jean-François, Steinberg, Jean Louis and Zisler, Siegfried, **Contrôle de l'activité geomagnétique par les centres d'activité solaires distingués par leurs propriétés radioélectriques.** [Control of geomagnetic activity by the centers of solar activity characterized by their radioelectric properties.] *Académie des Sciences, Paris, Comptes Rendus*, 232(25):2290–2292, June 18, **1951.** graphs, refs., equations. **DWB**—In the period from 1948–1950, 74 *active* centers (with respect to radioelectric effects) and 65 *inactive* centers on the sun are plotted parallel to the magnetic character of the same day. The curves show that the magnetic activity shows a sharp maximum 1 or 2 days after the passage of an *active* center across the central meridian of the sun, and a regular minimum 2 or 3 days after the passage of a inactive center. The first type gives sharp storms of the non-recurrent kind, while the recurrent storms are not associated with radio-electric phenomena. *Subject Headings:* **1. Solar influences 2. Magnetic storms 3. Radioelectric phenomena.**—*M.R.*

3.8–214 551.590.21 551.510.535

Kiepenheuer, K. O., **Solar-terrestrische Erscheinungen.** [Solar-terrestrial phenomena.] *Naturforschung und Medizin in Deutschland 1939–1946, Astronomie, Astrophysik und Kosmogonie*, 20:229–284, **1948.** 16 figs., 7 tables, 44 refs., 25 equations. Also: *FIAT Review of German Science*, 1939–1946. **DLC**—This highly condensed summary includes: 1) instruments and methods of solar observation, including photometry, magnetic field, and radiation in meter, cm and far UV wave lengths; 2) results, with daily charts of photosphere, chromosphere and corona; 3) ionizing radiation and the ionosphere, energy of UV sources and 4) a note on corpuscular radiation and its effects. *Subject Headings:* **1. Ionosphere 2. Solar activity 3. Solar influences.**—*C.E.P.B.*

OPTICAL PHENOMENA

3.8–215 551.593.63

Edgington, S. J., **Rare lunar halo. South Pacific Ocean.** *Marine Observer*, 22(156):66, April **1952. DWB**—April 20, 1951, 27°32′S., 123°43′W. Complete halo in Cs haze, radius 16°44′ (Rankin's halo, due to pyramidal ice crystals). *Subject Heading:* **1. Halo observation.**—*C.E.P.B.*

3.8–216 551.593.63

Poncelet, Lucien, **Notes sur les halos, parhélies et autres phenomènes d'optique atmosphérique.** [Notes on halos, parhelia and other phenomena of atmospheric optics.] *Ciel et Terre*, 67(11–12):196–203, Nov.–Dec. **1951.** 4 figs., refs. **DWB**—An observation of parhelia in Abadan, Belgium, on March 6 between 7 and 8h at a 46° incidence of solar radiation is reported and the optics of halo and related phenomena discussed in general explanatory terms and illustrated with schematic drawings. A photo of an upper tangent arc of a halo observed at Dinant is presented and a watercolor painting of a halo at Waterloo on June 12, 1944 reproduced. *Subject Headings:* **1. Optical phenomena 2. Halos 3. Parhelia 4. Belgium.**—*G.T.*

3.8–217 551.593.64

Marshall, P. J. E., **Lunar corona, Red Sea.** *Marine Observer*, 22(156):65, April **1952.** fig. **DWB**—June 18, 1951, 18°46′N., 39°39′E., pale orange and green. *Subject Heading:* **1. Coronas.**

3.8–218 551.593.652:551.588.2

Wehner, Hans, **Ein Beitrag zum Problem der hohen Perlmutterwolken.** [A contribution to the problem of high mother-of-pearl clouds.] *Meteorologische Rundschau*, 4(9–10):180–181, Sept.–Oct. **1951.** fig., 6 refs. **MH-BH**—Criticizes cold stratosphere theory of H. Dietrichs (*see item* No. 9–152 in Sept. 1950 *Meteorological Abstracts*) on the example of Jan. 30, 1944, which Wehner associates with a warm stratosphere over Norway. These clouds are obstacle clouds in ozone inversion in northern West-weather type, visible because of clear skies in lee of mountains. *Subject Headings:* **1. Nacreous clouds 2. Orographic effects.**—*C.E.P.B.*

ATMOSPHERIC ELECTRICITY

(*See also items:* 3.8–36, –81)

3.8–219 551.594:551.508.94

Herath, Friedrich (*Bayreuth*), **Versuchsergebnisse der luftelektrischen Höhnenforschung am Aeronautischen Observatorium Lindenberg.** [Experimental results of atmospheric electricity investigation in the free atmosphere at Lindenberg Aeronautical Observatory.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 22, **1951.** 30 p. diagrs., tables, graphs. In German, English summary p. 29. Price DM 3,20. **DWB**—The compensation atmospheric electricity current in kites is studied by putting in circuit a galvanometer into the captive rope of the kite. The measurements consist of 8,044 current readings made in 352 kite ascents during 1920/21. The following topics are discussed: the components of the compensation current in the kite; calculation of current magnitudes; temporal and altitudinal distribution of the observational material; distribution of positive and negative currents; mean values of both types of currents; relationship between current magnitudes and wind etc.; application of the results of measurements of the compensation currents to such problems as the combustion of captive balloons; atmospheric electricity warning apparatus, etc.; the effect of atmospheric electricity upon aircraft; and the physiological effects of atmospheric electricity. *Subject Headings:* **1. Atmospheric electricity 2. Atmospheric electricity instruments 3. Kites 4. Lindenberg Observatory, Germany.**—*I.L.D.*

3.8–220 551.594.2

Gold, Ernest, **Thunderbolts: the electric phenomena of thunderstorms.** *Nature*, London, 169(4301):561–563, April 5, **1952.** **DWB**—Summary of discussion at Royal Astronomical Society Jan. 25, 1952, opened by E. Gold. T. W. Wormell described investigations on mechanism of lightning discharge, F. J. Scrase spoke on distribution and generation of electricity in clouds, R. H. Golde on localization of flashes to earth, E. T. Pierce described investigations of field changes and J. Durward discussed ball lightning as a real phenomenon. *Subject Headings:* **1. Lightning 2. Ball lightning.**—*C.E.P.B.*

3.8–221 551.594.2:621.316.93

Golde, R. H., **The collection of lightning fault statistics on overhead lines.** *British Electrical and Allied Industries Research Association, Technical Report* S/T63, **1950.** 15 p. 6 figs., 5 refs. Mimeographed. A description with specimen forms of the method of collecting statistics of faults due to lightning and for comparison, of lightning flashes to earth, and notes of information required. A map of flashes to earth on July 13, 1949, is included. *Subject Headings:* **1. Electrical engineering 2. Lightning.**—*C.E.P.B.*

3.8–222 551.594.21:551.594.221

Barnard, V., **The approximate mean height of the thundercloud charges taking part in a flash to ground.** *Journal of Geophysical Research*, 56(1):33–35, March **1951.** 1 table, 3 refs., equation. **DWB**—Electrostatic fluxmeters were used to measure the electrostatic field change E for 10 lightning flashes. Data show that the heights H vary from 2.5 to 8.7 km (average 5.2 km), and the electric moment $2QH$ of the discharge from 41 to 495 coulomb-km (average 182.5) which is of the same order as Schonland and Craib (1927) obtained in Somerset East, Cape Province, S.A. (94 coulomb-km). The formula used was $E=2QH/(H^2+D^2)^{3/2}$, where D is the horizontal distance from the point of observation. *Subject Headings:* **1. Lightning 2. Thunderstorm electricity 3. Johannesburg, South Africa.**—*M.R.*

3.8–223 551.594.21

Gunn, Ross, **Thunderstorm electricity.** (In: **Thunderstorm electricity.** Chicago, University, Dept. of Meteorology, Oct. **1950.** p. 129–147. 6 figs., table.) **DWB**—The author reviews his own contributions to the quantitative description of the "mechanism whereby fall electricity is placed selectively on precipitation elements" and the means by which this fall electricity results ultimately in lightning strokes. A description and diagrams of the meter which measures voltages from ten million volts to one ten-thousandth of a volt, and of the artificial charger are presented. Charge generation experiments are described.

Finally, abstracts of papers by the author on electrification of atmosphere are given. *Subject Heading:* **1. Thunderstorm electricity.**—*I.L.D.*

3.8–224 551.594.21

Israël, Hans (*Buchau, Federsee*), **Some remarks on the field-strength inside thunderclouds.** *Geofisica Pura e Applicata*, 20:177–180, July-Dec. **1951.** 9 refs. In English, German and English summaries p. 177. **MH-BH**—Recent measurements of the electric fields inside thunderclouds indicate much lower potential gradients (although the arrangement of changes in the model of SIMPSON and collaborators appears essentially correct) than were heretofore supposed. The basic features of measurements and theories of CHAPMAN (who obtained low gradients) and of ROSS GUNN (who obtained very high gradients during in-flight measurements) are reviewed, and the differences resolved theoretically. It is stated that the cloud and precipitation elements are "sparkling" thus providing a voltage regulator in the thunderstorm generator. If "sparkling" ceases, then lightning must serve as the mechanism for adjustment. The author tries to show that the radar echoes from inside thunderclouds must result from this "sparkling" but there is no basis for this contention. *Subject Headings:* **1. Thunderstorm electricity 2. Potential gradient.**—*M.R.*

3.8–225 551.594.21

Kuettner, Joachim, **Charge distribution in a thunderstorm.** (In: **Thunderstorm electricity.** Chicago, University, Dept. of Meteorology, Oct. **1950.** p. 107. 6 figs.) **DWB**—Results of electric field measurements made on 125 storms at the Zugspitze Observatory are summarized as follows: the center of the local positive charge, which is located at the base of the cloud, occurs at the freezing level; the charge extends horizontally less than one km; it is situated in the center of precipitation below the lightning center. The principal negative charge in the lower part of the cloud is near the −8°C level and is larger in extent than the lower positive charge. *Subject Headings:* **1. Electrical charges 2. Thunderstorm electricity 3. Zugspitz Observatory, Germany.**—*I.L.D.*

3.8–226 551.594.21:551.594.221

Norinder, Harald, **Lightning as an electromagnetic phenomenon.** (In: **Thunderstorm electricity.** Chicago, University, Dept. of Meteorology, Oct. **1950.** p. 231–247. 10 figs.) **DWB**—The characteristics of electrical discharges in a thunderstorm such as cloud-to-cloud and cloud-to-earth lightning, the variations of the electric field components and the method of its measurement, and the influence of latitude upon the duration of lightning strokes are discussed. *Subject Headings:* **1. Thunderstorm electricity 2. Lightning.**—*I.L.D.*

3.8–227 551.594.25

Gill, E. W. B., and Alfrey, G. F., **Production of electric charges on water drops.** *Nature*, London, 169(4292):203–204, Feb. 2, **1952. DLC**—While distilled water is freezing on an immersed chilled copper block a large potential develops, ice positive, water negative. This is attributed to a − charge frozen in growing ice layer and leaking to surface. As ice melts, a smaller reverse potential sometimes develops. Application to water droplets impinging on ice particles is that the part which freezes leaves a − charge and part which rebounds carries away a − charge. *Subject Heading:* **1. Electricity of precipitation.**—*C.E.P.B.*

ACOUSTICAL PHENOMENA

3.8–228 551.596.1:551.510.5

Eckart, G., **Charactéristiques acoustiques de l'atmosphère.** [Acoustical characteristics of the atmosphere.] *Recherche Aéronautique*, Paris, No. 21:59–66, May/June, **1951.** graphs, tables, refs. **DLC**—The theoretical and empirical properties of the atmosphere are defined quantitatively and application given to the propagation and absorption of sound waves travelling in an atmosphere with varying temperature and humidity. Several "standard atmospheres" including the NACA or "American" model are presented. Tables and graphs for computation are also given. Comparison is made between electromagnetic and acoustical propagation and damping. *Subject Headings:* **1. Acoustical propagation 2. Atmospheric structure.**—*M.R.*

3.8–229 551.596.1

Ellison, T. H., **The propagation of sound waves through a medium with very small random variations in refractive index.** *Journal of Atmospheric and Terrestrial Physics*, 2(1):14–21, 1951. 11 refs., 31 equations. **MH-BH**—A theoretical study of scattering in a field of known, slightly variable refractive index such as the atmosphere, first of an incident plane wave and secondly of a ray. It is found that "for a wave travelling in a statistically homogeneous medium where the scale of the variations in refractive index is suitably large compared with the wave length but small compared with the path length, the variations in intensity produced by the medium are proportional to the cube of the path length for short paths, but directly proportional to it for long paths." *Subject Heading:* **1. Acoustical propagation.**—*From author's abstract.*

3.8–230 551.596.5:551.501.89

Arabadzhi, V. I., **O nekotorykh kharakteristikakh groma.** [On some characteristics of thunder.] *Akademiia Nauk, SSSR, Doklady*, 82(3):377–378, Jan. 21, 1952. 2 figs., 3 refs. **DLC**—A brief report on experimental observation of thunder made in summer 1951 in Ganna-les, Minsk Province. For these observations the method described by W. SCHMIDT in *Meteorologische Zeitschrift*, 1941, was used, but the recorder had greater sensitivity than the one used by SCHMIDT. The most intense thunder was recorded 19 times during compression of the air, but SCHMIDT observed this phenomenon during exhaustion of the air. The usual frequencies of sound oscillations were observed by SCHMIDT as 2 hertz, in Ganna-les they were about 0.5 hertz. The author suggests that these differences may be due to differences in actual thunder conditions. *Subject Headings:* **1. Thunder 2. Observation techniques 3. Ganna-les, U.S.S.R.**—*N.T.Z.*

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON THE CLIMATE OF CENTRAL AND WEST AFRICA INCLUDING THE BELGIAN CONGO

By: *Harris P. Kramer*

EXPLANATORY NOTE

The region covered by this bibliography comprises the Cape Verde Islands and the west central or tropical sections of Africa, including all provinces of French West Africa and French Equatorial Africa, Gambia, the Guineas, Sierra Leone, Liberia, the Gulf of Guinea area (Ivory, Gold and Slave Coasts), and the Belgian Congo including Ruanda Urundi in the interior mountainous Lake Kivu region. The countries are arranged approximately geographically from west to east in the Outline of Contents below.

The present bibliography is selective, not exhaustive. The 200 or more items included have been chosen from over 800 available references. Additional references can be obtained by consulting bibliographic sources below designated by a dagger (†). A good source of climatic or observational data is noted by the asterisk (*).

The noteworthy contributions of Henry Hubert to meteorological research in French West Africa are so numerous that only a relatively few of the more comprehensive were included here. However, an exhaustive list of Hubert's works may be seen in Jouda "Bibliographie de l'Afrique Occidentale Française." Paris, 1937, p. 390–397, indexed p. 655 (*see* item 3H–106, below).

Other works which are applicable to this region and which were annotated previously, may be located by consulting the special bibliographies in MAB V. 2, No. 10, Oct. 1951 and V. 3, No. 1, Jan. 1952.

Particular attention is called to the excellent and extensive Bibliography of Regional Meteorological Literature for southern Africa (1486–1946, published by the Union of South Africa Weather Bureau in 1950 (*see* MAB 2, 5, 5, May 1952). In view of the comprehensive nature of this bibliography, we shall not attempt at the present time a further survey of the meteorological literature of South and East Africa.

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CLIMATOLOGY OF CENTRAL AFRICA

1845

3H–1 551.582.2(667)

*Trentepohl, J. J. et al, **Observactiones meteorologicae per annos, 1829–1834 & 1838–1842, in Guinea factae.** [Meteorological observations for the years . . . made in Guinea coast region.] *Collectanea Meteorologica*, Copenhagen, *3*, **1845.** 60 p. extensive tables. **DLC, DWB**—Observations made at a point on the Guinea coast, 5°24′N, 2°10′E, during this period are tabulated at length with explanatory notes. *Subject Headings:* **1. Climatic data 2. Guinea Coast.**

1867

3H–2 551.586:612

*Horton, James Africanus Beale, **Physical and medical climate and meteorology of the west coast of Africa.** Edinburgh, **1867.** 321 p. tables. **DLC, NNA**—From personal observation, author makes note of the climate throughout the region from the Bight of Benin, Gulf of Guinea, to Senegal. He considers the climatic elements, including temperature observations in the 1860's at various points, and speculates on causes, locations, topography, meteorological conditions, etc. affecting temperature. He discusses wind, humidity, pressure, ozone and clouds and seasons briefly. The section on medical climate includes general effects of hot climate on human life. He touches on diseases of the hot season and, in a more extensive way, treats diseases of the rainy season. In conclusion, he gives numerous hints as to dress, food, drink, etc. for Europeans for preservation of health in tropical climates. The work is indexed. *Subject Headings:* **1. Climatology 2. Medical climatology 3. Guinea Coast 4. West African Coast.**

1872

3H–3 551.506.5(666.1,669)

*Hann, Julius von, **Resultate der meteorologischen Beobachtungen angestellt von Gerhard Rohlfs in der Sahara und im Sudan.** [Results of meteorological observations kept by Gerhard Rohlf in the Sahara and in the Sudan.] *Petermanns Geographische Mitteilungen. Ergänzungsband,* 7(34):107–124, **1871–1872.** tables. **NNA**—Climatic observations made 1865–1866 at Ghadames, Mursuk, Schimmedru, in the Sahara, and Kuka in northern Nigeria are summarized and discussed. The tables, p. 107–120, contain daily observations for single months 1865–1867 at different points on the journey south from Ghadames on the Libyan-Algerian border to Kuka and other points in Nigeria. Fairly detailed observations of pressure, temperature, wind and sky conditions kept. *Subject Headings:* **1. Climatic data 2. Sahara Desert 3. Nigeria. I. Rohlfs, Gerhard.**

1875

3H–4 551.582(663,665.8)

Borius, A., **Recherches sur le climat du Sénégal.** [Research on the climate of Senegal.] Paris, **1875.** 327 p. figs., map (fold.), tables. **DWB**—Early exhaustive and detailed study. Contents include sections on climate of Cape Verde, of Saint Louis, etc., and of Senegal in general. Climatic elements and particular local phenomena are discussed for each region. Wind roses, comparative diagrams, summarized data, etc., are included. *Subject Headings:* **1. Climate of Senegal 2. Senegal, French West Africa.**

1883

3H–5 551.582(662)

*Dupouy, Edouard, **Météorologie du Soudan. Un hivernage au fort de Kita en 1882.** [Meteorology of the French Sudan. A rainy season at Kita, 1882.] *Revue Maritime,* Paris, 79:326–352, **1883.** 2 figs., 8 charts, tables. **DLC, NN.** Also: **La saison sèche au fort de Kita en 1882.** [Dry season at Kita, 1882.] *Ibid.,* 83:536–555, **1884.** 7 charts, tables. **DLC, NN**—Meteorological observations made in 1882 are analyzed; diagrams and summary tables are constructed, in the first paper for May–Oct. and in the second, for Nov.–April. *Subject Headings:* **1. Climate 2. Seasons 3. Kita, French Sudan.**

1884

3H–6 551.506.1 551.582.2(675)

*von Danckelman, Alexander, **Mémoire sur les observations météorologiques faites à Vivi (Congo inférieur) et sur la climatologie de la côte sud-ouest d'Afrique en général.** [Note on meteorological observations made at Vivi (lower Congo) and on the climatology of the southwest coast of Africa in general.] Berlin, **1884.** 92 p. figs., map (fold.), 28 tables plus appended tables p. 58–92, refs. **NN**—Detailed report of author's observations of usual elements (1882–1883) at Vivi is made, including summary data, detailed daily values by months, and some comparative notes and tables with data from Luanda, Gabon and other tropical African stations. *Subject Headings:* **1. Observational data 2. Climatic data 3. Climatology 4. West Equatorial African Coast 5. Vivi, Belgian Congo.**

1885

3H–7 551.582(667)

*Riggenbach, Albert, **Zum Klima der Goldküste.** [On the climate of the Gold Coast.] *Naturforschende Gesellschaft, Basel, Verhandlungen,* 7(3):753–794, **1885.** graph fold.), tables, refs. **DLC.** Review in *Symon's Monthly Meteorological Magazine,* 20:73–74, **1885. DLC**—Author summarizes meteorological work done on the Gold Coast up to that time (mostly by missionaries). Results of

DR. MÄHLY's observations on his journey into and at missions in the interior are reported with diagrams and daily curves of temperature and barometric fluctuation. Harmattan discussed. Observations are admittedly very fragmentary. *Subject Headings:* **1. Climatology 2. Gold Coast.**

1888

3H–8 551.582.2(667/8,675)

***Mitteilungen aus den Deutschen Schutzgebieten,** Berlin, v. 1–36, **1888 1929.** **DLC**—Serial contains, at irregular intervals, summaries of meteorological observations made in the various German colonies, including Togo and Cameroons in West Africa, other German colonies of Africa, German south Pacific islands and German New Guinea. *Subject Headings:* **1. Climatic data 2. Togo 3. Cameroons 4. New Guinea 5. South Pacific Islands.**

1890

3H–9 551.582(667,665)

*von Danckelman, Alexander. **Beiträge zur Kenntiss des Klimas des deutschen Togolandes und seiner Nachbargebiete an der Gold und Sklavenküste.** [Contribution to knowledge of climate in German Togo and the neighboring region of the Gold and Slave Coasts.] *Mitteilungen aus den Deutschen Schutzgebieten*, Berlin, 3:1–45, **1890.** map, 18 tables, refs. **NNA, DLC**—Summary and review of climatic observations, since 1783 in some cases, at various locations in the region, primarily Bismarckburg, are presented. Also: [**Notes on the paucity of rainfall in the Gold Coast region.**] by W. KÖPPEN, *Ibid.*, 4:24–26, 1891. And: [**Results of meteorological observations at Bismarckburg.**] *Ibid.*, 4:67–70, 1891. tables. **DLC**—Observations, 1888–1890, are tabulated and discussed briefly. *Subject Headings:* **1. Climatology 2. Climatic data 3. Gold Coast 4. Togo 5. Guinea Coast. I. Köppen, Wladimir.**

1892

3H–10 551.582(675)

*Étienne, E., **Le climat de Banana en 1890 suivi des observations météorologiques . . . 1889 1891.** [The climate of Banana in 1890 followed by meteorological observations . . . 1889–1891.] [*Belgian Congo. Government*.] *Publications*, No. 7, **1892.** 235 p. 12 figs., extensive tables. **DWB**—Eighteen months continual personal observations of the usual elements are tabulated with explanatory notes and diagrams. A final table gives a monthly climatic resume for the period. *Subject Headings:* **1. Climatology 2. Banana, Belgian Congo.**

3H–11 551.582.2(669)

*Russel, Frank, **Results of meteorological observations made at Akassa, Niger Territory, Feb. 1887 to Oct. 1888.** And: . . . **for May 1889 to Dec. 1890.** *Royal Meteorological Society, Quarterly Journal*, 15:199–206, 1889; 18–19–23, **1892.** tables. **DWB**—Regular and detailed observations of all usual elements made by author for these periods are summarized in tables and rather briefly discussed. *Subject Headings:* **1. Climatic data 2. Climatology 3. Akassa, Nigeria.**

1894

3H–12 551.582(675)

Lemaire, Ch., **Station d'Equateurville; observations météorologiques.** [Equatorville (Coquilhatville station; meteorological observations.] *Société Royale Belge de Géographie, Brussels, Bulletin*, 18:34–60, **1894.** graphs, table. **DLC, NNA**—Report made of observations of temperature and rainfall kept May, 1891–Dec. 1892, at Coquilhatville. Values are shown mostly in graphic form with notes and a table on occurrence of other meteorological phenomena. *Subject Headings:* **1. Climatology 2. Coquilhatville, Belgian Congo.**

3H–13 551.582.2(671.1)

*Trabert, Wilhelm, **Einiges über den täglichen Gang der Lufttemperatur zu Bismarckburg und des Luftdrucks zu Kamerun.** [Some notes on the daily temperature regime at Bismarckburg and pressure conditions in Cameroons.] *Mitteilungen aus den Deutschen Schutzgebieten*, Berlin, 7:247–264, **1894.** 4 tables. **NNA**—The annual temperature regime at Bismarckburg (in Dahomey) is studied using observations made between 1888–1891. Monthly means, maxima, minima, variations, etc., are tabulated. Atmospheric pressure on the Cameroons coast, Oct. 1889–April 1890, is discussed. A table shows hourly means for each month; variations are analyzed. *Subject Headings:* **1. Temperature 2. Atmospheric pressure 3. Kanga, Tanganyika 4. Cameroons.**

1899

3H–14 551.582(667/8)

*Gruner, H., Mischlich, A., von Seefried, —, von Danckelman, Alexander, **Aus dem Schutzgebiete Togo.** [From the Togo Protectorate.] *Mitteilungen aus den Deutschen Schutzgebieten*, Berlin, 12(1):1–37, **1899.** tables. **DLC**—Work in four parts as follows: 1. Observations on harmattan; 2) Remarks on the meteorological observations in Bismarckburg; 3) Remarks on the meteorological observations in Sugu-Wangara in March 1897 and 4) Summary remarks. Characteristics and attending meteorological conditions of harmattan are discussed. Temperature, humidity, wind, dust, cloud and precipitation measurements for Bismarckburg and Sugu-Wangara, 1896–1897, are tabulated in some detail. *Subject Headings:* **1. Harmattan 2. Climatic data 3. Togo.**

1905

3H–15 551.582(672)

*Bruel, Georges, **Notes sur la météorologie de la région du Chari.** [Notes on the meteorology of the Shari region.] *Société Météorologique de France, Annuaire*, 53:233–251, **1905.** graphs, tables. **NN**—Some observations of temperature, pressure and precipitation, 1900–1903, at Forts Sibut, Crampel and Archambault are reported including some summarized data. (Note: observations considered made with correct thermometer installation). [**Similar notes for period, 1899–1901.**] *Ibid.*, 50:69–77, 1902. [**Notes on some observations made at Mobaye, Ubangi-Shari.**] *Ibid.*, 47:15–20, 1899. 2 figs., table. Brief summary of some rainfall and temperature observations, 1896–1898 at Mobaye and some notes and diagrams on river levels of the Ubangi. *Subject Headings:* **1. Climatology 2. Ubangi-Shari, French Equatorial Africa 3. Mobaye, Ubangi-Shari.**

1906

3H–16 551.577.2(667/8)

*von Danckelman, Alexander, **Die Niederschlagsverhältnisse des Schutzgebietes Togo.** [Precipitation conditions in the Togo Protectorate.] *Meteorologische Zeitschrift, Hann-Band*, **1906.** p. 145–151. chart, tables. **NN**—Precipitation totals kept at various stations in Togo between about 1890–1905 are summarized in tables by years and months and discussed. *Subject Headings:* **1. Precipitation 2. Togo 3. Guinea Coast.**

1907

3H–17 551.582.2(667/8)

*Maurer, Hans, **Das Klima von Togo.** [Climate of Togo.] *Mitteilungen aus den deutschen Schutzgebieten*, Berlin, 20:115–122, **1907.** 3+tables. **DLC, NNA**—Some temperature but mostly rainfall means for various stations of Togo region in 1906 are tabulated and discussed. *Subject Headings:* **1. Climatology 2. Togo.**

1909

3H–18 551.582(661,675)

Hann, Julius von, [**Brief notes and data on the climates of various regions.**] *Meteorologische Zeitschrift*, v. 5, 7, 9, 11, 19–22, 26, **1888, 1890, 1892, 1894, 1902–1905, 1909.** **DLC**—These notes appear in German on the various regions of Central West Africa as follows: São Salvador, Congo (v. 5, p. 394–395); Upper Senegal and Niger Basin (v. 7, p. 391–392); Banana, Congo (v. 9, p. 397–399); Equatorville (Coquilhatville), Congo (v. 11, p. 478–480); Upper Chari, French Sudan (v. 19, p. 509–512); Timbuktu (v. 20, p. 37–40); Cameroons (v. 21, p. 537–547); French Congo coast (v. 22, p. 39–40); Bolobo, Congo (v. 26, p. 185–186). *Subject Headings:* **1. Climatology 2. São Salvador, Portuguese Congo 3. Senegal, French West Africa 4. Banana, Belgian Congo 5. Coquilhatville, Belgian Congo 6. Upper Schari, French Sudan 7. Timbuktu, French Sudan 8. Cameroons 9. French Congo Coast 10. Bolobo, Belgian Congo.**

3H–19 551.582(661)

†Marc, Lucien, **Météorologie.** [Meteorology.] (In his: **Le pays Mossi.** [The Mossi (tribe) country.] Paris, **1909.** p. 40–69. 5 figs., 8 tables, refs.) **NNA**—Region includes that area centered about the bend in the Niger, 10° to 0°W and 5° to 15°N. General climatic characteristics are discussed; charts show monthly rainfall distribution. Tables give summary data, 1902–1906, of rain, temperature and humidity at various points in the region. Footnotes give references to several early sources of data for the region. *Subject Headings:* **1. Climatology 2. Niger River Basin, French West Africa.**

3H–20 551.577.2(661,665.2)

Marc, Lucien, **La répartition de la pluie entre la côte de Guinée et le sommet de la boucle du Niger.** [Distribution of rainfall between the Guinea coast and the top of the bend in the Niger.]

Annales de Géographie, Paris, 18:34–45, 1909. 4 figs., refs. **DLC, NNA**—Area covers region from about 6°W to 1°E, coast to 17°N. All rainfall observations available for the region are collected, studied and summarized to determine rainfall distribution. Diagrams show monthly distribution patterns, and conditions are summarized and discussed in text. *Subject Headings:* **1. Precipitation 2. Niger River Basin, French West Africa 3. Guinea Coast.**

3H–21 551.577.2(662)

*Müller, Rudolf, **Regenverteilung, Pflanzendecke und Besiedlung Ober-Guineas und des westlichen Sudan.** [Rainfall distribution, vegetation cover and colonization in upper Guinea and the western Sudan.] *Geographische Zeitschrift*, Leipzig, 15:620–641, 684–701, 1909. 2 figs., map, numerous refs. **DLC, NNA**—Rainfall distribution and some of the resulting climatic characteristics of this "region of the double rainy season," from Guinea to Cameroons, are discussed. A diagram and some summary data are included, as well as numerous references in footnotes. Vegetation and colonization are discussed in the second section. *Subject Headings:* **1. Precipitation distribution 2. Climatology 3. Guinea Coast 4. Cameroons 5. French Sudan.**

1910

3H–22 551.582.2(669)

*Nigeria. Medical Dept., **Annual report, 1908–1910.** Zungeru, 1909–1911. **DWB**—Contains meteorological reports for each year, monthly means of temperature, rainfall and wind direction for various locations. *Subject Headings:* **1. Climatic data 2. Nigeria.**

1913

3H–23 551.555.8

*Braby, H. W., **The harmattan wind of the Guinea coast.** *Royal Meteorological Society, Quarterly Journal*, 39:301–306, 1913. 6 tables. **DWB**—Character of the harmattan in the hinterland of the Guinea coast is discussed. Tables summarize five years of observation, 1907–1911, at Zungeru, Nigeria, giving climatic means during days of harmattan and no harmattan for each year. *Subject Headings:* **1. Harmattan 2. Nigeria 3. Guinea Coast.**

3H–24 551.515.41(665.2)

Schwartz, Paul, **La formation des orages dans les régions montagneuses de l'Afrique occidentale française.** [Formation of thunderstorms in the mountainous regions of French West Africa.] *Géographie*, Paris, 27:208–210, 1913. **DLC, NNA**—Author gives his theories on thunderstorm formation in the mountainous sections of Guinea, from personal observations, (a further development of HUBERT's theory, 1911). He cites hourly observations made of a particular storm on Mount Souti, May 1906. *Subject Headings:* **1. Thunderstorm formation 2. French Guinea.**

1915

3H–25 551.542(662,661)

Chudeau, R., **Trois perturbations barométriques au Nord de Tombouctou.** [Three barometric disturbances to the north of Timbuktu.] *Annales de Géographie*, Paris, 23 24:443–449, Nov. 1915. 2 figs., rets. **DLC, NNA**—Author reports on his observations of barometric pressure at Araouan, Nov. 7–Dec. 10, 1913. Up until Dec. 1, day-to-day pressure values varied little, but after Dec. 3, pressure and wind conditions changed simultaneously and brought unusual rainfall. He gives detailed account of pressure conditions during that year and references to other years. A diagram shows pressure curves for Araouan, Timbuktu and other stations of French West Africa for Nov.–Dec. 0913. *Subject Headings:* **1. Atmospheric pressure 2. Timbuktu, French Sudan 3. French West Africa.**

1916

3H–26 551.577.2(669,667)

Brooks, Charles E. P., **The rainfall of Nigeria and the Gold Coast.** *Royal Meteorological Society, Quarterly Journal*, 42:85–106, 1916. 5 figs., 5 tables, refs. **DWB**—Using data from different stations of the two countries for varying periods prior to 1913, the author discusses the general precipitation conditions of the several regions, computes monthly and annual rainfall statistics and constructs isohyets. *Subject Headings:* **1. Precipitation 2. Nigeria 3. Gold Coast.**

3H–27 551.582(66,67)

†Chudeau, R., **Le climat de l'Afrique occidentale et équatoriale.** [The climate of West and Equatorial Africa.] *Annales de Géographie*, Paris, 25:429–462, 1916. 12 figs., tables, numerous

refs. **DLC, NNA**—A fairly thorough, general study. Three climatic types in the region between 5°S and 28°N are determined: the dry Saharan, the humid equatorial, and the intermediates. Temperature conditions in the various regions are discussed with diagrams. Influence of the seas, forests and mountains are considered. Yearly and two seasonal isotherms are shown. Pressure conditions and perturbations are taken up, and isobars constructed. Brief sections discuss wind, hygrometry, evaporation, rainfall and "tornadoes." And, finally, the various climates of the region are classified. Many references are given in footnotes. Review in *Geographical Review*, 7:276, 1919. (*See also* his three brief consecutive articles on temperature, pressure and precipitation of the same region in *Académie des Sciences, Paris, Comptes Rendus*, 161:106–109, 351–354, 392–395, 1915.) *Subject Headings:* **1. Climatology 2. West Africa 3. Equatorial Africa.**

3H–28 551.582(661)

Hubert, Henry, **Mission scientifique au Soudan: fasc. 1. L'Atmosphère.** [Scientific mission to the French Sudan: Pt. 1. The atmosphere.] Paris, **1916.** 319 p. 185 figs., 5 plates, 3 tables. **NN**—Extensive, detailed work. Area includes broadly W. Africa from 24°N to the Gulf of Guinea. Author gives as complete a survey of all climatic elements of the region as possible at that time; however, meteorological information then was very scanty. Work is well illustrated with maps and diagrams. *Subject Headings:* **1. Climatology 2. French Sudan.**

1917

3H–29 551.577.2:551.579(66,67)

†*Niehoff, Kurt, **Oberflächengestaltung, Niederschagl und Abfluss des Niger und seiner Nachbargebiete; auf Grund einer zweijährigen Studienreise.** [Surface structure, precipitation and runoff of the Niger and its surrounding region; on the basis of a two-year expedition.] *Mitteilungen aus den Deutschen Schutzgebieten*, Berlin, 30:339–403, **1917.** 3 figs., charts (fold. in back), 4 tables, 146 refs. **DLC, NNA**—Principally hydrographic study, but precipitation is considered p. 349–381, using observations from 225 rain stations for varying periods between 1886–1912. Rainfall and vegetation map, rainfall graphs, etc. are included. In the bibliography references numbers 87–109 are climatological; references 110–146 are sources of rainfall data for the region (not exhausted in the present bibliography). *Subject Headings:* **1. Precipitation 2. Hydrology 3. Niger River Basin 4. French West Africa 5. Guinea Coast Region.**

1919

3H–30 551.582(666) 551.586.1

*Ross, Emory, **The climate of Liberia and its effect on man.** *Geographical Review*, New York, 7:387–402, **1919.** 4 figs., 6 tables. **DLC, NNA**—Report is made on the climate of Liberia using the first series of meteorological observations to be kept in Liberia (by the author and some others) between 1913 and 1917. Records are summarized in text and means for different periods are tabulated. The various important climatic elements are discussed, and their effects on human life noted. *Subject Headings:* **1. Climatology 2. Human activity 3. Liberia.**

1920

3H–31 551.571.2(669)

*Brooks, Charles E. P., **The distribution of relative humidity over Nigeria.** *Royal Meteorological Society, Quarterly Journal*, 46:289–292, **1920.** fig., table. **DWB**—Table gives monthly mean values of relative humidity at 9 a.m. at various stations of Nigeria computed from *Nigeria Gazette* and *Blue Book* data for varying periods. Seasonal and annual isolines are charted along with explanation and discussion in text. *Subject Headings:* **1. Relative humidity 2. Nigeria.**

3H–32 551.524.2(669)

*Brooks, Charles E. P., **The distribution of temperature over Nigeria.** *Royal Meteorological Society, Quarterly Journal*, 46:204–214, **1920.** 6 figs., 2 tables. **DWB**—Author deals with mean monthly temperature distribution using data from official sources for numerous stations during varying periods. Isotherms are drawn and mean daily maximum, minimum and mean temperatures are tabulated for months and year. *Subject Headings:* **1. Temperature distribution 2. Nigeria.**

3H–33 551.577.62 551.583

Hubert, Henry, **Le dessèchement progressif en Afrique Occidentale.** [Progressive desiccation in West Africa.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Bulletin*, Gorée, 3:401–467, **1920.** 8 photos, refs. **NNA.** Review by Th. Monod in *Revue Internationale de Botanique Appliquée et d'Agriculture Tropicale*, 30:633–636, Nov./Dec. 1950. **NNA**—Extensive investigation is made of all evidence obtainable on progressive desiccation of French West

Africa. Conditions in prehistoric and in historic times are discussed, including decreasing rainfall, erosion, encroaching sands caused by prevailing winds, and other natural causes as well as artificial causes, i.e., man, insects, etc. A collection of unedited notes by various observers from numerous different regions concerning evidence of desiccation in French West Africa is appended (p. 429–467). *Subject Headings:* **1. Desiccation 2. Climatic changes 3. French West Africa. I. Monod, Th.**

3H–34 551.526

*Janke, Johannes, **Strömungen und Oberflächentemperaturen im Golfe von Guinea.** [Wind currents and surface temperatures in the Gulf of Guinea.] *Aus dem Archiv der Deutschen Seewarte*, Hamburg, 38(6), **1920.** 68 p. 5 figs., 5 plates, tables. **NNA**—Using material collected by German ships in the region, 1869–1909, the author discusses meteorological conditions over the Gulf of Guinea. Wind conditions and the principal seasonal wind currents, trades and monsoons, and temperature conditions, monthly and annual distribution, anomalies and annual variations, are discussed. *Subject Headings:* **1. Climatology 2. Winds 3. Temperature 4. Gulf of Guinea.**

1921

3H–35 551.510.42:551.555.8

Hubert, Henry, **Nouvelles observations sur la brume sèche en Afrique occidentale.** [New observations of the dry haze in West Africa.] *Comité d'Études Historiques et Scientifiques de L'Afrique Occidentale Française, Bulletin*, Gorée, 4:45–57, **1921.** table, refs. **DLC, NNA**—Nature, extent, variations, and causes of the atmospheric dust which causes the dry haze over French West Africa are studied and results are summarized in a brief table. *Subject Headings:* **1. Dust 2. Haze 3. Harmattan 4. French West Africa.**

1922

3H–36 551.586:58

*Chipp, Thomas Ford, **The climate and its relation to forest distribution.** (In his: **The forest officers' handbook of the Gold Coast, Ashanti and the Northern territories.** London [1922] p. 34–46. charts (fold.), tables.) **NNA**—In discussing relations between climate and vegetation in the Gold Coast it is suggested that the consideration of rainfall effect, not only total annual fall, but also number of wet days must be taken into account, and that on the basis of these two factors the Gold Coast may be divided into climatic zones corresponding approximately to the zones of natural vegetation. Rainfall records from 46 stations and of temperature and relative humidity for 13 stations of the region for 2–15 years are studied and summarized in tables. Graphs show rainfall and vegetation relations. *Subject Headings:* **1. Climatology 2. Bioclimatology 3. Forests 4. Gold Coast.**

3H–37 551.515.4 551.577.2(661)

Hubert, Henry, **Nouvelles recherches sur les grains orageux et les pluies en Afrique Occidentale.** [Recent research on thundersqualls and rainfall in West Africa.] Paris, Publication du Gouvernement Général de l'Afrique Occidentale Française, **1922.** 42 p. 47 figs., tables, refs. **NN**—Detailed study is made of thunderstorm observations kept at numerous stations in French West Africa during 1921. Characteristics discussed are: direction of origin, speed of passage, length of line, and of trajectory, dimensions of cloud, lightning, and amount and distribution of rain. Numerous charts give a graphic representation of the rainfall. One series shows each year 1907–1908; another, amounts in each month of 1921. *Subject Headings:* **1. Thunderstorms 2. Thunderstorm rainfall 3. French West Africa.**

1923

3H–38 551.582.3(661)

French West Africa. Service Météorologique, **Résumé des observations météorologiques faites en Afrique Occidentale Française jusqu'au 31 Décembre 1921.** [Summary of meteorological observations made in French West Africa up to Dec. 31, 1921.] Paris, **1923.** 62 p. 208 graphs. **NN**—Work consists entirely of graphs with only brief explanatory introduction. All meteorological observations prior to 1922 at numerous stations are summarized in these graphs which give curves for each climatic element for each year of observation. *Subject Headings:* **1. Climatology 2. Climatic charts 3. French West Africa.**

3H–39 551.5:06 551.582(661)

†Hubert, Henry, **Le Service Météorologique de l'Afrique Occidentale Française en 1922.** [The Meteorological Service in French West Africa in 1922.] Paris, **1923.** 77 p. 67 figs., 22 refs. **NN**—Author reviews the organization, personnel, stations, methods, etc. Then he gives results of meteorological studies during 1922 on charts rather than in tables: precipitation, amount, frequency,

distribution; thundersqualls, observations and information on their propagation; temperature and humidity. He discusses local observations, forecasting, upper wind observations, cloud, haze, fog, etc. *Subject Headings:* **1. Meteorological services 2. Climatology 3. French West Africa.**

1924

3H–40 551.582.1(675)

Gasthuys, P., **Le climat de diverses régions agricoles du Congo belge.** [Climate in various agricultural regions of Belgian Congo.] *Belgium. Direction Général de l'Agriculture, Bulletin Agricole du Congo Belge*, 15(2):376–385, June **1924. DLC, NNA**—Brief descriptive summaries of the climatic characteristics of the various districts of the Congo with some exemplary climatic means in text. *Subject Headings:* **1. Climatology 2. Belgian Congo.**

1925

3H–41 551.582(661):629.13

Hubert, Henry, **La securité de la navigation aérienne entre Port Étienne et Dakar.** [Safety of air navigation between Port Etienne and Dakar.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Bulletin*, Gorée, 8:9–56, **1925.** 5 graphs, refs. **NNA**—Consideration of meteorological factors and their variations is included. The numerous climatic elements are considered separately with data shown graphically. Brief recommendations for airplanes and flying safety are added. *Subject Headings:* **1. Aeronautical climatology 2. French West African Coast.**

3H–42 551.515.4:551.509(661)

Mugnier-Serand, J., **Nouvelles recherches en vue de la prévision des grains en Afrique occidentale française au moyen de la T. S. F.** [Recent research with respect to forecasting of squalls in French West Africa by means of the radio.] *Comité de'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Bulletin*, Gorée, 8:57–87, **1925.** refs. **DLC, NNA**—Observations made 1922–24 on the formation and approach of thunder squalls and particularly of accompanying electrical phenomena (sferics) are recorded by days of occurrence and discussed. Two methods of observation used are described. *Subject Headings:* **1. Thunderstorm forecasting 2. French West Africa.**

1926

3H–43 551.577.2(667)

*Auchinleck, G. G., **Rainfall of the Gold Coast (summary to end of 1924).** *Gold Coast. Agricultural Dept., Bulletin* No. 2, **1926.** 18 p. figs., map (fold.), 2 tables. **NN**—Statistics of rainfall up to end of 1924 from 57 stations in region are collected. Causes for the relatively great differences in annual rainfall in so short a distance are explained as due to configuration of the land. Isohyets are shown on map. Stations are listed and mean-monthly and total rainfalls for each, tabulated. *Also:* **Seasonal and geographical distribution of rainfall in the Gold Coast.** *Gold Coast Review*, 2(1):28–33, **1926.** map, diagr., table. **NN**—Seasonal fluctuations of air currents and rainfall are considered. *Subject Headings:* **1. Precipitation 2. Gold Coast.**

3H–44 551.506.1(661,672)

*France. Bureau Central Météorologique, **Annales. 1877 1920.** (with some interruptions). Paris, **1877–1926.** tables. **NN**—Contains tables of daily observational data for each year for stations in northern Africa and for various stations (somewhat different in different years) in Senegal, French Sudan, Dahomey and French Congo, as well as for other French possessions. *Subject Headings:* **1. Observational data 2. Annual reports 3. French West Africa 4. French Equatorial Africa.**

3H–45 551.582(661)

Hubert, Henry, **Nouvelles études sur la météorologie de l'Afrique Occidentale Française.** [New studies on the meteorology of French West Africa.] Paris, **1926.** 200 p. 332 figs., map, 2 plates, 24 refs. **NN**—Extensive and detailed survey is made of the climate of the whole region, including area south from 20°N to the Gulf of Guinea coast, based on the author's long experience with the meteorological department there as well as on his personal observations. All climatic elements are considered at length, and all data are represented graphically. Included are detailed studies of radiation, temperature, pressure, atmospheric circulation and the typical air currents of the region, state of the sea, relative humidity, water vapor pressure, clouds, precipitation, haze, fog, dew, visibility, optical phenomena, atmospheric electricity, storms at different seasons, and weather forecasting. *Subject Headings:* **1. Climatology 2. French West Africa.**

1927

3H–46 551.586:58

Chipp, Thomas Ford, **Climatology.** (In his: **The Gold Coast forest: a study in synecology.** Oxford, **1927.** p. 22–37. 14 figs., table, 8 refs.) **NNA**—The general climatic features of the Gold Coast, especially in relation to the forest areas, are discussed; data are represented in climatic charts constructed for various locations in the region. The table summarizes meteorological values for the forest regions. *Subject Headings:* **1. Climatology 2. Bioclimatology 3. Forests 4. Gold Coast.**

3H–47 551.509:551.515.4(661)

Thizy, R., **Contribution à l'étude de la prévision des grains en Afrique Occidentale Française au moyen de la T. S. F.** [Contribution to the study of squall forecasting in French West Africa by means of radio.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Bulletin,* Gorée, 10(3–4):20–476, July–Dec. **1927.** map, 12 figs., 3 tables, refs. **DLC, NNA**—Author refers to earlier works (*see item* 3H–42) on the study of the thundersqualls of W. Africa, their forecasting and analysis by use of atmospheric parasites (sferics), and then makes his own contributions. He analyzes several particular cases of 1926 in detail and offers his conclusions. Fairly brief tables give observations of thunder at Dakar when cumulonimbus were visible and when not visible, and days when no thunder was heard but storms were in region. *Subject Headings:* **1. Thunderstorms 2. Thunderstorm forecasting 3. French West Africa.**

1928

3H–48 551.582.2(667)

*Chamney, N. P., **The climatology of the Gold Coast.** *Gold Coast. Agricultural Dept. Bulletin* No. 15, **1928.** 63 p. map (fold.), 11 plates, 13 tables, 16 refs. **NN**—All meteorological data available up to the end of 1927 are summarized. All the usual elements are considered, including the harmattan, with their relationship to Gold Coast climate and methods of recording each. Stations are listed, climatological data for varying periods tabulated, and isohyet and isotherm charts drawn. Effects of climate on Gold Coast agriculture are noted. *See also:* **Meteorology and agriculture in the Gold Coast,** in *Gold Coast Agricultural and Commercial Society, Journal,* 6(3):175–177, July/Dec. 1927. *Subject Headings:* **1. Climatology 2. Agricultural climatology 3. Gold Coast.**

3H–49 551.555.8:551.571

Chamney, N. P., **The harmattan and atmospheric humidity.** *Gold Coast. Agricultural Dept. Bulletin* No. 16:286–288, **1929.** 2 plates, table. **NN**—Article deals with the desiccating influence which this dry NE wind has on the air. Graphs show curves of atmospheric relative humidity during harmattan, Oct. 1927–March 1928 at 12 stations. *Subject Headings:* **1. Harmattan 2. Relative humidity 3. Gold Coast 4. West Africa.**

3H–50 551.582.2(667)

*Chamney, N. P. and Adams, J. M., **Meteorological records in the Gold Coast for 1928 . . . 1929.** *Gold Coast. Agricultural Dept. Bulletin* No. 16:289–301, 1929; No. 22:364–373, **1929.** maps, tables. **NN**—1928 and 1929 meteorological observations are organized in tables and isohyets to the end of each year are drawn. *Subject Headings:* **1. Climatology 2. Climatic data 3. Gold Coast.**

1929

3H–51 551.591:551.510.42

Pummerer, Paul M., **Meteorologische Beobachtungen an ozeanischen Inseln und Küsten während der 8. Forschungsfahrt der Deutschen Seewarte nach Südamerika. I. Sichttrübungen im Bereich der Kapverdischen Inseln.** [Meteorological observations of ocean islands and coasts during the 8th research expedition of the Deutsche Seewarte to South America. I. Atmospheric turbidity in the region of the Cape Verde Islands.] *Annalen der Hydrographie und Maritimen Meteorologie,* 56:186–192, **1929.** 2 figs., 5 refs. **DLC**—Observations including soundings up to 15,000 m kept on voyage are reported and discussed with reference to the dust in the atmosphere and the poor visibility conditions. *Subject Headings:* **1. Dust 2. Visibility 3. Cape Verde Islands.**

3H–52 551.506.5(661.1)

*Rodd, Francis Rennell, **The meteorological results of journeys in the southern Sahara 1922 and 1927.** Discussion by C. E. P. Brooks and S. T. A. Mirrlees. *Great Britain, Meteorological Office, Geophysical Memoirs,* No. 48, **1929.** 40 p. map, 6 figs., 25 tables, plus appended tables, refs. **NN**—Area covered lies between 12° and 20°N and 0° and 11°E. Paper consists mainly of the discussion of climatological observations. Sections take up the general climate of the southern Sahara, instruments and methods, pressure, temperature, humidity, winds, cloud, rain and other phenomena,

and visibility. Summary tables are included, and detailed meteorological diaries kept by Ror are appended. (For full geographical accounts see *Royal Geographical Society, Journal*, 73, Nos. and 2, 1929, and Aug. 1923.) *Subject Headings:* **1. Climatology 2. Climatic data 3. Sahara Deser I. Brooks, Charles E. P. II. Mirrlees, S. T. A.**

3H–53 551.582(67

Rühle, Karl Erhard, **Das Klima.** [Climate.] (In his: **Physiogeographie des saharisch sudanischen abflusslosen Gebietes [Tschadseebecken].**) [Physiogeography of the Sahara-Suda interior drainage region, Lake Chad Basin.] Leipzig, **1929.** p. 68–88. 6 tables, 15 refs.) **NNA**— Descriptive account of principal climatic elements of the region including some summary tables monthly means for different stations in the area. *Subject Headings:* **1. Climatology 2. Lake Cha Basin, French Equatorial Africa 3. Sahara Desert.**

1930

3H–54 551.577.2(675

Berce, R., **À propos d'une périodicité des pluies dans le Bas-Congo et à Elisabethville.** [Discussion of rainfall periodicity of the lower Congo and at Elizabethville.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 21(2):551–559, June **1930.** 5 figs. **NNA** Also appears as part of an essay on tropical meteorology in *Annales de Gembloux*, 36(10):337–360 Oct. **1930.** refs. p. 356–360. **DA**—On the basis of observations from several stations of the differen regions of the Congo for different periods of years ranging from 2 or 3 to 17, 1908–1928, indications o periodicities in rainfall are sought, and curves drawn. *Subject Headings:* **1. Rainfall periodicities 2. Belgian Congo.**

3H–55 551.582(666

Coolidge, Harold Jefferson, **Climate of Liberia.** *Monthly Weather Review*, 58:291–292, **1930.** 4 figs. **DWB**—Summary of Liberian climate July–Nov. is made as a result of a four-month expedition in 1926. Various diagrams illustrate monthly conditions of sun, rain and temperature during the visit. Mean values of climatic conditions are summarized in text. *Subject Headings:* **1. Climatology 2. Liberia.**

3H–56 551.506.2(661)

*French West Africa. Service Météorologique, **Observations Météorologiques.** Dakar, **1923–1930.** tables. **DWB**—Detailed observations (three times daily in some cases) made at the principal meteorological station, Dakar, are tabulated on separate sheets. *Subject Headings:* **1. Observational data 2. Dakar, French West Africa.**

3H–57 551.577.2(661,665.2,672)

*Gold Coast. Agricultural Dept., **Tables of mean annual rainfall.** *And:* **Rainfall chart of West Africa.** *Gold Coast. Agricultural Dept. Bulletin* No. 23:324–329, **1930.** tables, map. **NNA** —Map shows mean distribution of rainfall for the West Africa-Guinea coastal region from St. Louis, French West Africa, to Cameroons. Tables give rainfall means for varying periods of years before 1926 for stations of French Sudan, Senegal, Gambia, French Guinea, Sierra Leone, Liberia, Gold Coast, Togo, Haute Volta, Dahomey, Nigeria, Cameroons, and French Niger, 338 stations in all. *Subject Headings:* **1. Precipitation 2. French West Africa 3. Guinea Coast 4. Cameroons.**

3H–58 551.5(6):016

†Welter, Lucien, **Bibliographie météorologique de l'A. O. F.** [Meteorological bibliography of French West Africa.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Bulletin*, Gorée, 13(3/4):475–482, July/Dec. **1930.** 85 refs. **NN**—Includes references for all parts of French West Africa, south to Gulf of Guinea, including tropical and equatorial as well as desert regions, arranged in alphabetical order and not annotated. *Subject Headings:* **1. Climatology 2. Bibliographies 3. French West Africa.**

3H–59 551.577:551.590.21

Welter, Lucien, **La pluie à Dakar et l'activité solaire.** [Rainfall at Dakar and solar activity.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Bulletin*, Gorée, 13(2):264–271, April/June **1930.** 3 graphs, 2 tables. **NNA**—Solar activity and amount of rainfall are compared by plotting data from Dakar for 1887–1929 on graph; they appear to coincide. *Subject Headings:* **1. Precipitation 2. Solar influences 3. Dakar, French West Africa.**

1931

3H–60 551.582:016(667)

†Cardinall, Allan Wolsey. **Climate.** (In his: **A bibliography of the Gold Coast; issued as a companion volume to the census report of 1931.** Accra, [1931.] Section 14, p. 299–301. 50 refs.) **NNA**—Alphabetical, unannotated list of works from 1890 to 1919, dealing mostly with Gold Coast but including some on other or broader sections of West Africa. *Subject Headings:* **1. Climatology 2. Bibliographies 3. Gold Coast 4. West Africa.**

3H–61 551.582.2(661)

*French West Africa. Service Météorologique. **Resumé des observations du mois.** Jan. 1923–June 1931. tables. **DWB**—Separate sheets contain monthly summaries of observational data from numerous stations of French West Africa. *Subject Headings:* **1. Climatic data 2. French West Africa.**

3H–62 551.577.2(667/8)

†*Pignol, Raoul. **Niederschlagverhältnisse des alten deutschen Schutzgebietes Togo.** [Precipitation conditions of the old German protectorate of Togo.] *Aus dem Archiv der Deutschen Seewarte*, Hamburg, 49(6), **1931.** 62 p. 3 plates of figs. (fold.), 16 tables, 40 refs. **NN**—A thorough survey of precipitation conditions in Togo is made using observations kept mostly 1905–1913 (during German ownership). Bibliography contains references to sources of precipitation and wind observations in Togo. *Subject Headings:* **1. Precipitation 2. Togo.**

3H–63 551.577.3(661)

*Rousseau, R., **Les pluies au Sénégal de 1887 à 1927.** [Rainfall in Senegal 1887–1927.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Bulletin*, Gorée, 14:157–182, Jan.–June **1931.** 13 maps, graphs, 5 tables, refs. **NNA**—The great variations of rainfall both seasonal and regional in Senegal are shown. Monthly and annual means are calculated and tabulated for numerous stations, and clear and illustrative rainfall graphs and maps are included. *Subject Headings:* **1. Precipitation variations 2. Senegal, French West Africa.**

3H–64 551.501.9

Scaëtta, H., **Comité météorologique congolais. Première organization d'un réseau de climatologie agricole sur les dorsales Congo-Nil.** [Congo meteorological committee; first organization of an agricultural climatic network in the Congo-Nile divide region.] *Ciel et Terre*, Brussels, 47:219–228, 269–276, **1931.** 11 photos, plate, map (fold.). **NN**—History and development of a climatic network in the mountainous section of the divide of the Congo and Nile Rivers is discussed along with photographs and map of the stations. *Subject Headings:* **1. Meteorological networks 2. Congo-Nile Divide (Kivu) Region, Belgian Congo.**

1932

3H–65 551.583

Aufrère, L., **La signification de la latérite dans l'évolution climatique de la Guinée.** [Significance of laterite in climatic evolution of Guinea.] *Association de Geographes Français, Bulletin*, Paris, No. 60:95–97, June **1932. NNA**—Brief discussion of the distribution in tropical Africa, especially in Guinea, of laterite and its significance as an indicator of climatic changes since its original formation to the present. *Subject Headings:* **1. Climatic changes 2. Laterite 3. French Guinea 4. Tropical Africa.**

3H–66 551.513

Brooks, Charles E. P. and Mirrlees, M. A., **A study of the atmospheric circulation over tropical Africa.** *Great Britain. Meteorological Office, Geophysical Memoirs*, No. 55, **1932.** 15 p. 18 figs., map, 2 tables, 5 refs. **DWB**—A new and more complicated theory of atmospheric circulation over a tropical continent (in this case, Africa) is developed. Pressure and wind and their relations to rainfall conditions during the different seasons are analyzed. Illustrative pressure, air movement and rainfall charts are appended. Lack of upper air data is admittedly a drawback. *Subject Headings:* **1. Atmospheric circulation 2. Tropical Africa.**

3H–67 551.557

*Geiger, Rudolf and Wagner, Fritz, **Höhenwinde vor der westafrikanischen Küste in Herbst.** [Upper winds along the west African coast in the fall.] *Aus dem Archiv der Deutschen Seewarte*, Hamburg, 51(2), **1932.** 63 p. 12 figs., 4 plates (fold.), 7 tables, 33 refs. **NNA**—Results of the 13th expedition of the Deutsche Seewarte, Sept.–Nov. from Germany down the coast of Africa to Freetown and back, are reported and analyzed at length and supplemented by upper wind measurements

kept on German commercial vessels in the region. Aerial cross sections at various points along the way are drawn showing winds at different altitudes, cloud and temperature conditions, etc. Occurrences of "tornadoes" are noted, with accompanying meteorological conditions. The daily records of the expedition are appended as well as numerous summary calculations and charts. *Subject Headings:* **1. Upper air winds 2. West African Coast.**

3H–68 551.582:016(675)

†Leplae, Edmond, **Observations et publications météorologiques au Congo Belge.** [Meteorological observations and publications on the Belgian Congo.] *Belgium. Institut Royal Colonial Belge, Bulletin des Séances*, 9(1):179–215, **1932.** 3 figs., tables, numerous refs. **NNA**—Important listings and reviews of meteorological work done on Belgian Congo are presented beginning in 1878 (some with annotations), providing an excellent source of early works (most of which are not included in the present bibliography). Earliest observations are listed by region. Later ones appear in chronological order and are briefly summarized. Notes on founding and development of stations are included. *Subject Headings:* **1. Climatology 2. Bibliographies 3. Belgian Congo.**

3H–69 551.586:631

Thomas, A. S., **The dry season in the Gold Coast and its relation to the cultivation of cacao.** *Journal of Ecology*, London, 20(2):263–269, Aug. **1932.** table, 12 refs. **NNA**—Climate of Gold Coast is discussed in relation to cacao cultivation. Points out that rainfall of the dry months is more important to cacao production than that of the whole rest of the year. Table gives degrees of wetness by month, entire year and dry season, Nov.–Feb., for 24 stations in different parts of Gold Coast. *Subject Headings:* **1. Agricultural climatology 2. Gold Coast.**

1933

3H–70 551.583

Borgniez, G., **Sur la possibilité d'existence de périodes à climat désertique dans la région centrale du Congo Belge.** [On the possibility of existence of a desert climate period in the central Belgian Congo region.] *Académie des Sciences, Paris, Comptes Rendus*, 197:1667–1668, Dec. **1933. NN**—Very brief note on geologic evidence (a layer of sand) that a desert climate might have existed for several epochs in region. *Subject Headings:* **1. Climatic changes 2. Belgian Congo.**

3H–71 551.586 551.584

Scaëtta, H., **Bioclimats, climats des associations et microclimats de haute montagne en Afrique Centrale Equatoriale.** [Bioclimates, ecological climates, and microclimates of the high mountainous region of Central Equatorial Africa.] *Journées d'Agronomie Coloniale, Gembloux, Comptes Rendus*, No. 23/24:503–509, June **1933. DA**—Reference is made to some of the chief contributors to the field of bioclimatology and their work. Three special examples of microclimates are chosen for discussion: 1) microclimate of nocturnal temperature inversion, 2) microclimate associated with brush fires and 3) microclimate determined by radiation. *Subject Headings:* **1. Bioclimatology 2. Microclimatology 3. Fire weather 4. Congo-Nile Divide (Kivu) Region, Belgian Congo.**—*M.P.K.*

1933

3H–72 551.577.2 551.582(675)

*Scaëtta, H., **Les précipitations dans le bassin du Kivu at dans les zones limitrophes du Fossé tectonique.** [Precipitation in the Kivu basin and in the bordering zones of the Rift Valley.] *Belgium. Institut Royal Colonial Belge, Mémoires*, 2(2), **1933.** 108 p. 28 figs., maps, 16 diagrs., 10 plates, 16 photos. refs. p. 104–106. Data separate under title: **Observations pluviométriques; réseau du Kivu (1928 1931).** [Rainfall observations; Kivu network (1928–1931).] *Belgium. Direction Générale de l'Agriculture, Bulletin. Agricole du Congo Belge*, 25(2):217–249, **1934. NNA**—The entire data for the above work are tabulated. In the main body of the work the extent of this climatic region and development possibilities, particularly for agriculture are determined in a detailed and comprehensive study. Pedologic, biologic, topographic and climatologic features are studied in their relations to precipitation. Dynamic and thermic origins of the rain are discussed; vertical and horizontal distribution of precipitation; thunderstorm occurrences, origin, movement and effects; the rainfall regime, intensities, daily variations; hail, snow, etc. Numerous illustrative charts, graphs and photos are included as well as references which are of general nature mostly. Review by E. DE WILDEMAN in *Institut Royal Colonial Belge, Bulletin des Séances*, 3(3):658–663, 1932. *Subject Headings:* **1. Climatology 2. Precipitation 3. Climatic data 4. Congo-Nile Divide (Kivu) Region, Belgian Congo. I. de Wildeman, E.**

3H–73 551.577.2(671.1) 551.555.8

*Semmelhack, Wilhelm. **Regenmessungen in Likomba-Kamerun.** [Rainfall measurements at Likomba (Douala) Cameroons.] *Annalen der Hydrographie und Maritimen Meteorologie*, 61:129–131, **1933.** 7 tables, refs. **NNA**—Summary tables given of rainfall, 1925–1932, at this location, 4°6′N, 9°20′E. Also: **Die Regenverhältnisse von Debundscha in Kamerun.** [Rainfall conditions at Debundscha Cameroons.] *Ibid.*, p. 146–158. map, 2 plates, 17 tables, refs. **NNA**—Using observations, 1895–1931, kept at a station on the coast of Cameroons, means, variations, days with rain, sunspot effects, etc. are calculated and briefly tabulated. Also: **Beginn und End der Harmattanzeit im Küstengebiete von Kamerun.** [Beginning and end of the harmattan season in the coastal region of Cameroons.] *Ibid.*, p. 263–264. **DLC**—Brief note on dates of harmattan, beginnings, duration, and ending as observed at Debundscha on the coast, 1913–1924. And: **Regenmessungen in Oechelhausen-Kamerun.** [Rainfall measurements . . . Cameroons.] *Ibid.*, p. 389–392. 9 tables. **DLC**—Using rainfall observations from this station, 4°5′N, 9°3′E, between 1910–1932, tabulated summaries are made of means, monthly maxima and minima; day and night distribution, monthly intensities, numbers of rain days, etc. *Subject Headings:* **1. Precipitation 2. Harmattan 3. Cameroons Coastal Region.**

1934

3H–74 551.506.2(669)

*Nigeria. Survey Dept., **Meteorological observations in Nigeria during the Polar Year, 1932–1933 . . .** Lagos, **1934.** 95 p. 2 maps (fold.), diagrs., tables. **DWB**—Notes on methods of observation, locations and instrumental set-ups of stations are followed by detailed tabulations of observations at eight stations. Pilot balloon observations at Kaduna are tabulated giving "new" information on strength and prevalence of the harmattan winds at various altitudes. Mean hourly values of meteorological elements at Lagos observatory, frequency of thunder at Polar Year stations, and hourly values of sunshine at Kaduna and Victoria, and extracts of log books are included. Finally, a report of a study of the barometric wave at Lagos is presented. Illustrative maps and graphs are included as well as tables. *Subject Headings:* **1. Observational data 2. Upper air data 3. Sunshine data 4. Harmattan 5. Thunder 6. Atmospheric pressure 7. International Polar Year 1932–1933 8. Nigeria.**

3H–75 551.585(666.8)

Portères, Roland. **Sur un indice de sécheresse dans les régions tropicales forestières. Indices en Côte d'Ivoire.** [On an aridity index in tropical forest regions. Indices in the Ivory Coast.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Bulletin*, Gorée, 17(4):653–665, Oct./Dec. **1934.** 6 refs. **DLC, NNA**—Theoretical article discusses determination of the aridity index in general and as applied to various Ivory Coast regions in particular. *Subject Headings:* **1. Aridity index 2. Tropical forest regions 3. Ivory Coast.**

3H–76 551.582(675)

*Scaëtta, H., **Le climat écologique de la dorsale Congo-Nil.** [The ecological climate of the Congo-Nile divide.] *Belgium. Institut Royal Colonial Belge, Mémoires*, v. 3, **1934.** 335 p. 61 diagrs., 20 plates, map, tables, refs. p. 321–324. **NNA**—A detailed climatic study of the region is made, for use in regional development particularly agricultural development. Each climatic element is considered, generally and regionally, including summary data in tabular or graphic form and a list of references on the element in general. A long chapter considers "regional bioclimates" including numerous aspects and relations of different vegetational and climatic conditions, localities, altitudes, microclimates, etc. Many data and illustrations are included. The references are mostly general rather than regional. *See also* his similar work on the climate and vegetation of this "divide" or Lake Kivu region, *Annales de Géographie*, 44:264–280, **1935.** 3 plates, 6 figs. **NNA**—Five years observations are used in general discussion of climate, soil and vegetation; graphs of air circulation and radiation, climagrams, and photographs, included. *Also:* Climate of the Congo-Nile divide, *Ciel et Terre*, 50:52–59, 67–80, **1934.** 5 figs. **NN**—Similar general article in which emphasis is laid on radiation and rainfall conditions, for which climagrams are included. *Subject Headings:* **1. Climatology 2. Ecology 3. Congo-Nile Divide (Kivu) Region, Belgian Congo.**

3H–77 551.515(662.6,661)

Smith, D. E., **The west African tornado.** *Meteorological Magazine*, London, 69:7–9, Feb. **1934.** table. **DWB**—Brief but comprehensive summary of the causes and characteristics of this phenomena from study of detailed anemograms, barograms, hygrograms and thermograms made during 13-month period of the Polar Year at Lagos Observatory. Table shows computed values for six tornado occurrences: wind speed, temperature drop, pressure variations, for the three preceding and following hours, and rainfall. *Subject Headings:* **1. Squalls 2. Nigeria 3. West Africa.**

1935

3H–78 551.591.2(661)

Barberon, J.. **La visibilité en A. O. F.** [Visibility in French West Africa.] *Annales de Physique du Globe de la France d'Outre-Mer*. 2/11 :139–140, Oct. 1935. 12 charts. **NNA**—Observations of visibility in 1934 (often made by untrained observers) in French West Africa are summarized by months for the different regions and illustrated by charts. *Subject Headings:* **1. Visibility 2. French West Africa.**

3H–79 551.591.2(672)

Devauges, —. **La visibilité horizontale en Afrique Equatorial Française au nord de Bangui.** [Horizontal visibility in French Equatorial Africa north of Bangui.] *Annales de Physique du Globe de la France d'Outre-Mer*. 2/11 :140–148, Oct. 1935. 12 figs. **NNA**—Part of series on visibility in French colonies; follows BARBERON's [Visibility in French West Africa.] p. 139–140. Notes on fog and haze are followed by visibility charts showing numbers of days in each month of 1934 that visibility was less than 2 km. *Subject Headings:* **1. Visibility 2. Fog 3. Haze 4. French West Africa 5. French Equatorial Africa.**

3H–80 551.577.33 551.543

Frolow, S.. **Analyse harmonique de la pression atmosphérique de 8 heures à Niamey (A. O. F.).** [Harmonic analysis of 8 o'clock atmospheric pressure at Niamey, French West Africa.] *Annales de Physique du Globe de la France d'Outre-Mer*. 2/7 :7–20, Feb. 1935. graphs. **NNA**—The observations analyzed were made 1933–1934. Results are shown graphically. Also [Preliminary analysis of rainfall at Dakar.] *Ibid.* p. 168–170, Dec. 1935. graphs. p. 177 table. 5 refs. Periodicity in rainfall at Dakar is discussed, using data 1901–1921. Observational period admittedly inadequate for conclusions. *Subject Headings:* **1. Atmospheric pressure 2. Niamey, French West Africa 3. Rainfall periodicities 4. Dakar, French West Africa.**

3H–81 551.557:551.513

Hubert, Henry. **Les mouvements généraux de l'air atmosphérique au-dessus des colonies françaises.** [General movements of the atmosphere over the French colonies.] *Annales de Physique du Globe de la France d'Outre-Mer*. 2/1–27, Feb. 1935. 28 figs. **NNA**—Atmospheric soundings over French West African colonies, 1931–1934, are collected, condensed and analyzed. The various important components: monsoon, harmattan, cyclo, etc. are discussed in general and at particular locations. A section is included on French Somaliland, East Africa. Graphs show distributions at different altitudes every five days for numerous stations. Observations in other French colonies of the world are included briefly. *Subject Headings:* **1. Atmospheric circulation 2. Upper air winds 3. French West Africa 4. French Somaliland.**

3H–82 551.582(661) 551.557

*Mildner, Paul and Markgraf, Hans. **Meteorologischer Reisebericht und Höhenwindmessungen auf der Fahrt nach Kamerun Mai bis Juni 1933 im Polarjahre 1932/33.** [Meteorological travel report and upper wind measurements on the trip to Cameroons May–June 1933 in the polar year 1932–1933.] *Aus dem Archiv der Deutschen Seewarte*. Hamburg, 54/3, 1935. 40 p. 2 figs. 8 photos. 7 plates. tables. **NN**—Detailed report is made of meteorological and upper air conditions observed on an expedition from Germany to the Cameroons by ship skirting the entire W. Africa coast. Daily log, wind conditions, cloud photos, upper air observations, charts and diagrams, etc. are included. *See also item 3H–84 below.* *Subject Headings:* **1. Climatology 2. Upper air winds 3. West African Coast.**

3H–83 551.583.3

Urvoy, Y.. **Terrasses et changements de climat quaternaires à l'est du Niger.** [Terraces and Quaternary climatic changes in eastern Nigeria.] *Annales de Géographie, Paris*. 44/247 :254–263, May 1935. 7 figs., ref. **DLC, NNA** Discussion of geologic evidence of Quaternary climatic changes. Figures are diagrams of terrace formations in different localities. *Subject Headings:* **1. Climatic changes 2. Nigeria.**

3H–84 551.582(661.665) 551.557

*Zistler, Peregrin and Müller, F.. **Meteorologischer Reisebericht und Ergebnisse der Höhenwindmessungen von der Fahrt nach Kamerun, Juli Aug., 1933.** [Meteorological travel report and results of upper air wind measurements on the trip to Cameroons, July–Aug. 1933.] *Aus dem Archiv der Deutschen Seewarte*. Hamburg, 54/2, 1935. 41 p. 26 figs., 12 photos, 7 tables, 25 refs. **NN**—Detailed report of meteorological and upper air conditions observed on an expedition from Germany to the Cameroons skirting the West African and Guinea coasts. Meteorological conditions

during periods of the west wind, the northeast trade and the southwest monsoon are noted. Solar radiation measurements are reported along with upper wind and cirrus observations during the voyage. (*See also* item 3H–83 above.) *Subject Headings:* **1. Climatology 2. Climatic data 3. Upper air wind measurements 4. West African coast 5. Guinea coast.**

1936

3H–85 551.513:551.557

§Durward, J., **Weather changes on the West African air route.** *Meteorological Magazine*, London, 71:227–229, **1936.** fig., table. **NN**—Author analyzes a navigation report, Geneina-Kano, April 22, 1936, by which he seems to find it possible to connect changes of weather on the West African air route with the passage of depressions across the Mediterranean and the western desert of Egypt. Table gives upper air winds between El Geneina in West Anglo Egyptian Sudan and Kano, Nigeria. *Subject Heading:* **1. Atmospheric circulation 2. Upper air winds 3. El Geneina-Kano air route, West Central Africa.**

3H–86 551.506.1(661)

*French West Africa. Service Météorologique. **Bulletin, Nos. 1–6, 1931–1936.** Dakar [1932–1938.] **DWB**—Observations for various climatic elements and aerological soundings at numerous places in French West Africa are tabulated in detail for each month of these years. *Subject Headings:* **1. Climatic data 2. Upper air data 3. French West Africa.**

3H–87 551.582(662)

Frolow, S., **Note sur le climat de Niamey.** [Note on the climate of Niamey.] *Comité d'Études Historiques et Scientifique de l'Afrique Occidentale Française. Bulletin*, Gorée, 19:150–187, **1936.** 8 plates, table. **DLC, NNA**—Each of the usual elements and various typical disturbances are discussed separately and illustrated with diagrams. *Subject Headings:* **1. Climatology 2. Niamey, French West Africa.**

3H–88 551.542.3

§Frolow, S., **Les variations de la pression en Afrique Occidentale Française en Mai 1934.** [Pressure variations in French West Africa in May 1934.] *Annales de Physique du Globe de la France d'Outre-Mer*, 3:14–46–50, 57–58, April **1936.** 17 charts, ref. **NN**—Using observations of the official meteorological service, author analyzes the pressure conditions over French West Africa during May 1934. One series of charts shows isobars for 24 hours, and another, for 48 hours. Variations are discussed. *Subject Headings:* **1. Pressure variations 2. French West Africa.**

3H–89 551.506.7(672)

Gouault, Jean, **Mesures de température et d'humidité effectuées en avion à Fort-Lamy.** [Temperature and humidity measurements made in an airplane at Fort-Lamy.] *Annales de Physique du Globe de la France d'Outre-Mer*, 3:97–100, Aug. **1936.** graphs and table on p. 107–109. **NNA**—Results of measurements made March 6, 1936 between 0 and 4000 altitude are given, briefly analyzed, and presented graphically. One graph showing wind directions (from soundings March 3–6) illustrates the progress of the monsoon invasion. *Subject Headings:* **1. Upper air observations 2. Monsoons 3. Fort-Lamy, French Equatorial Africa.**

3H–90 551.582.2(669,667,664)

*Great Britain. Meteorological Office. [**Meteorological observations made in British colonies and protectorates . . . 1909–1936.**] tables. **DWB**—Summary tables for each year are extracted by the Meteorological Office from colonial government documents and printed on sheets by country. "Notes . . ." appear separately, giving information on instruments, stations, etc. for each colony. Nigeria, Gambia, Gold Coast, and Sierra Leone are the colonies of Central West Africa for which monthly and annual summaries (from various stations), 1909–1936, appear. *Subject Headings:* **1. Climatic data 2. Nigeria 3. Gambia 4. Gold Coast 5. Sierra Leone.**

3H–91 551.552 551.578.72(665.2)

Hobeniche, P., **Notes sur divers phénomènes météorologiques en Guinée française.** [Notes on diverse meteorological phenomena in French Guinea.] *Comité d'Étude Historique et Scientifique de l'Afrique Occidentale Française, Bulletin*, Gorée, 19(2–3):222–227, April–Sept **1936.** 2 maps. **DLC, NNA**—Wind conditions are studied and a map drawn showing zones in terms of frequency, distribution and strength of winds. Occurrences of hail in region 1932–1934, are noted and a zone of most frequent occurrence mapped. *Also:* [**Aerological study of the Conakry region.**] *Ibid.*, p. 228–236. 4 plates, diagrams, table.—The large general air currents—harmattan, trades, monsoon

—affecting Conakry are discussed. Then local winds are discussed. Wind roses for Conakry for Jan., April, July, Oct. 1934 are included as well as a table of directions by months. *Subject Headings:* 1. Winds 2. Hail 3. Aerological studies 4. Conakry, French Guinea 5. French Guinea.

3H–92 551.582.665.2(661)

Hoberechts, P., **Notice climatologique sur le Fouta-Djallon.** [Climatological note on Fouta-Djalon.] *Agronomie Coloniale, Paris*, 25 [20] 44–47, Feb. 1936. 2 tables. Also [Climatic notes on the Guinea coast.] *Ibid.*, 24 [20] 136–145, May 1935. 3 tables. **NNA**—Author gives general climatic characteristics in both cases along with some summary climatic data. *Subject Headings:* 1. Climatology 2. Fouta-Djalon, French Guinea 3. Conakry, French Guinea.

3H–93 551.578.72(661)

Ploq, P., **Les chutes de grêle au Sénégal en 1934.** [Hailstorms in Senegal, 1934.] *Annales de Physique du Globe de la France d'Outre-Mer*, 3 [3–4] 1936. **NNA**—Rev. in *Geographical Review*, New York, 27 151, Jan. 1937. **DLC**—Occurrence of hailstorms in Senegal, French West Africa from 1921–1934, briefly noted. *Subject Headings:* 1. Hail 2. Senegal, French West Africa.

3H–94 551.582.661

Ploq, P., **Note sur divers phénomènes météorologiques au Sénégal.** [Note on the various meteorological phenomena in Senegal.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Bulletin*, [Cent. 19] 1–2, 140–149, 1936. 4 figs. **DLC NNA**—Author discusses briefly such phenomena as transformation of cloud systems from one type to the other, at Saint-Louis, the divergence of the "cornaches" (harmattan squalls) and the influence of the sea, the origin of poor visibility and the winter haze on the coast of lower Senegal, and hail storms in 1934. *Subject Headings:* 1. Climatology 2. Senegal, French West Africa.

3H–95 551.501.2.55+510.42.001.1(661)

Ploq, P., **Notes sur l'origine des faibles visibilités et des brouillards d'hiver sur la côte du bas Sénégal.** [Notes on the origin of the poor visibility and the winter haze on the coast of lower Senegal.] *Annales de Physique du Globe de la France d'Outre-Mer*, 3 [3] 1936. **NNA**—Causes of the haze which causes poor visibility on this coast from Nov. to April are enumerated and discussed briefly. *Subject Heading:* 1. Visibility 2. Harmattan haze 3. Senegal, French West Africa.

3H–96 551.575.11.001.1

Ploq, P., **Transformations des systèmes nuageux d'Est au voisinage de Saint-Louis A.O.F.** [Transformations in the cloud systems from the east in the vicinity of Saint-Louis, French West Africa.] *Annales de Physique du Globe de la France d'Outre-Mer*, 3 [3] 1936. 5 figs. p. 99–111 **NNA**—Types and conditions of cloud passing over the region are briefly described. *Subject Headings:* 1. Cloud systems 2. Saint-Louis, French West Africa.

3H–97 551.555.8

Weisse, L., **Les vents de sable au Soudan.** [Sand storms in the Sudan.] *Annales de Physique du Globe de la France d'Outre-Mer*, 3 [3] 1936. 4 figs., p. 149–159. **NNA.** Translation by A. ZAWADSKI *American Meteorological Society, Bulletin*, 18 [7] 278–279, Sept. 1937. **MH-BH**—Study is based on observations during 1934. Climatology points interpreted. Author suggests some factors of use in forecasting, in particular upper winds. Diagrams showing paths and hourly speeds of sand storms observed. Also **Note sur les vents de sable au Soudan en 1934.** [Notes on Sudanese sand storms.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Publications, Sér. B*, No. 3 [1] 41–45, 1937. **DLC**—Frequency, duration and distribution of sand storms in French Sudan noted. *Subject Headings:* 1. Sand storms 2. Weather forecasting 3. French Sudan, French West Africa.

1937

3H–98 551.552.(661) 551.578.7

Bongrand, —, **Note sur le régime du vent à Port-Étienne.** [Note on the wind regime at Port-Étienne.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Publications, Sér. B*, No. 3 [1] 31–34, 1937. Hail storm, tables. **DLC**—Brief observations given on prevailing winds (particularly land winds due to the Atlantic trades) and dust storms (harmattan). Tables give percentage frequencies by month and direction at Port-Étienne 1921–1930, and figures show these values graphically. Also **Note sur la grele en A.O.F.** [Note on hail in French W. Africa.] *Ibid.*, p. 93–98. *Subject Headings:* 1. Winds 2. Hail 3. Port-Etienne, French West Africa.

3H–99 551.577 551.591.2(661)

Buroleau, —. **Note sur les courants aériens à Dakar.** [Note on air currents at Dakar.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Publications*, Ser. B, No. 3:35–40. 1937. 2 charts (fold.), table. **DLC**—Resume is made of the aerial currents observed at Dakar. Summary table shows for the five principal wind types: trade, counter-trade, monsoon, harmattan and prevailing westerly—the period (months) during which each blows; altitudes at base and summit, velocity at base and summit; and direction. Charts show greatest frequencies of wind direction at different altitudes in 1933 at 6h and 16h G.M.T. *Also:* **Note sur la visibilité a Dakar.** [Note on visibility at Dakar.] *Ibid.*, p. 69–70. 2 diagrs. Variations of visibility at Dakar observed in 1933 are briefly noted and graphically represented. *Subject Headings:* **1. Upper air winds 2. Monsoons 3. Trade winds 4. Harmattan 5. Visibility 6. Dakar, French West Africa.**

3H–100 551.555.8

Foissy, A., **Note sur l'harmattan . . . sur les oscillations de la limite sud de l'harmattan au sol en fonction du mouvement du soleil de part et d'autre de l'équateur.** [Note on the harmattan . . . on the oscillations of the southern limit of the surface harmattan as a function of the movement of the sun across the equator.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Publications, Ser. B.*, No. 3:25–32. 1937. 2 figs. **DLC**—Results are given briefly of a study of observations made at Gao and Kouroussa and those received from Bamako and Conakry. The harmattan, its characteristics, variations, extent, causes and effects at the surface only is considered. It is found to have a distinct effect on the climate and life of a region during the time of its occurrence. *Subject Headings:* **1. Harmattan 2. French West Africa 3. French Guinea.**

3H–101 551.582(662,661)

Foissy, A., **Rapport climatologique de Gao (Soudan).** [Climatological report for Gao (French Sudan).] *Comité d'Études Historiques et Scientifique de l'Afrique Occidentale Française, Publications, Ser. B.* No. 3:1–23. 1937. 17 figs., plate (fold.). **DLC**—Extract from the annual report of the meteorological station at Gao, 1933. Observations are analyzed; each element is considered separately with values shown graphically, rather than in tables: temperature, pressure, winds, harmattan and trades, atmospheric and relative humidity, vapor pressure, cloud. *Subject Headings:* **1. Climatology 2. Gao, French Sudan 3. French West Africa.**

3H–102 551.506.1(661) 551.591

*French West Africa. Service Météorologique. **Annuaire, Fréquences.** Dakar, 1936–1937. 2 v. **DWB**—Observations of horizontal visibility and wind at the surface are tabulated for each month for numerous stations of French West Africa, including French regions on Gulf of Guinea. *Subject Headings:* **1. Climatic data 2. Wind frequencies 3. Visibility 4. French West Africa.**

3H–103 551.515.4(672)

Gouault, Jean, **Description de l'orage du 30 avril 1936 à Fort-Lamy.** [Description of the thunderstorm of April 30, 1936 at Fort-Lamy.] *Annales de Physique du Globe de la France d'Outre-Mer*, 4:33–35. April 1937. 3 photos. **DLC**—An hour by hour account of meteorological conditions at Fort-Lamy (near Lake Chad) on a day when a violent and destructive thunderstorm hit that settlement. The storm moved in from the ENE with winds estimated at 100 m.p.h. about 5 p.m. The occurrence and even the intensity of the storm could have been forecast at 1300 G.M.T. if equipment (which was later installed) for registering atmospheric parasites (now called sferics) had been operating. *Subject Headings:* **1. Thunderstorms 2. Fort-Lamy, French Equatorial Africa.**—*M.R.*

3H–104 551.593:551.591 551.555.8

Gouault, Jean, **Vents de sable et brumes sèches dans la région du lac Tchad (1935–36 et 1936–37).** [Sand storms and dry haze in the region of Lake Chad (1935–36 and 1936–37).] *Annales de Physique du Globe de la France d'Outre-Mer*, 4:65–70, 77–80. June 1937. 4 figs., 2 photos, ref. **NNA**—Summary made of results of two years observations of these phenomena considered so dangerous to aviation. Graphs illustrate frequencies, duration, visibility conditions, etc. *Subject Headings:* **1. Sandstorms 2. Haze 3. Lake Chad Region, French Equatorial Africa.**

3H–105 551.582(668)

†*Heilgermann, Edgar, **Beiträge zur Klimatologie von Togo.** [Contributions to the climatology of Togo.] *Aus dem Archiv der Deutschen Seewarte*. Hamburg. 57(3). 1937. 84 p. 4 plates (fold.), 29 figs., 34 tables, 37 refs. **NNA**—Using observations made for various periods, 1906–1913 (under German ownership), a detailed climatological study is made. Each element is considered individually, and detailed tabulated data, charts, graphs and diagrams are appended. *Subject Headings:* **1. Climatology 2. Togo.**

3H–106 551.582(661):016

†Joucla, Edmond Antoine, **Bibliographie de l'Afrique Occidentale Française.** [Bibliography of French West Africa.] Paris, **1937.** 704 p. 9543 refs. **NNA**—Many references to meteorological material are included in this general bibliography. Items are unannotated, arranged alphabetically by author, and indexed (p. 655) under the general heading "Climatology, meteorology, seismology, terrestrial magnetism." Varying numbers of works for some 70 authors are included, a more exhaustive list than the present bibliography. *Subject Headings:* **1. Climatology 2. Bibliographies 3. French West Africa.**

3H–107 551.588.6

Leplae, Edmond, **La grande forêt équatoriale congolaise; son influence sur le régime des pluies; défrichements nécessaires à la prospérité des indigènes.** [The great equatorial forest of the Congo; its influence on rainfall regime; clearing necessary to the wellbeing of the inhabitants.] *Congo,* Brussels, 18(5):473–542, **1937.** 14 figs., refs. **NNA**—The article deals primarily with the extent and characteristics of forests in the Congo. Possible effects they may have on climate are investigated, with the conclusion that any effects are purely local; the forests do not in any degree affect the rainfall regime of the colony as a whole (a conclusion contradictory to earlier theories). *Subject Headings:* **1. Climatology 2. Precipitation 3. Forest influences 4. Belgian Congo.**

3H–108 551.555

Rodewald, Martin, **Das Grüne Westafrikas als Stätte einer quasistationären Strömungssingularität.** [Cape Verde, West Africa as the location of a quasi-stationary air current singularity.] *Annalen der Hydrographie und Maritimen Meteorologie,* 65:206–211, **1937. NNA**—Cape Verde is discussed as the location of the convergence of three currents, the harmattan, trade and monsoon. Charts show the wind systems and weather conditions at different times of year. The association of the West African "tornadoes" and tropical cyclones of the ocean with this wind system is discussed. *Subject Headings:* **1. Harmattan 2. Trade winds 3. Monsoons 4. Tropical cyclones 5. Squalls 6. Cape Verde, French West Africa.**

3H–109 551.582(67) 551.587

†Scaëtta, H., **Études météorologiques entreprises en Afrique Centrale.** [Meteorological studies undertaken in Central Africa.] *La Météorologie,* **1937.** p. 88–98, map, 3 figs., 11 refs. **NN**—Large map shows locations of the 40 stations established in this Congo-Nile divide region, centering about Lake Kivu, between 1927 and 1930. List is included of 11 papers dealing with results of observations at the various stations. Although no upper air soundings are available, author considers upper air circulation, using cloud observations, and makes deductions. Other aspects of climate and consequent vegetation are noted. *Subject Headings:* **1. Climatology 2. Upper air climatology 3. Congo-Nile Divide (Kivu) Region, Belgian Congo.**

3H–110 551.583.3

Scaëtta, H., **Variations de climat pleistocène en Afrique Centrale.** [Variations of the Pleistocene climate in Central Africa.] *Annales de Géographie,* Paris, 46:164–171, **1937.** refs. **DLC, NNA**—Geologic evidence of climatic change in the Pleistocene is noted for various sectors of mountainous Central Africa, including the Congo-Nile divide (Lake Kivu) region. *Subject Headings:* **1. Climatic changes 2. Congo-Nile Divide (Kivu) Region, Belgian Congo 3. Central Africa.**

3H–111 551.582:629.13(669)

Smith, D. E., **Meteorological conditions affecting flying in Nigeria.** *Nigeria Gazette,* 24:83–86, **1937. NN**—Brief general remarks on visibility, West African tornado and surface winds. Upper wind data are not yet comprehensive, but existence of reversal in first 3000 m is noted as a usual occurrence. *Subject Headings:* **1. Aeronautical climatology 2. Nigeria.**

3H–112 551.577:551.579

Vanderlinden, R., **Note sur le régime hydrographique du bassin du Congo.** [Note on the hydrographic regime of the Congo Basin.] *Belgium. Institut Royal Colonial Belge, Bulletin des Séances,* 8(3):862–884, **1937.** figs., 5 maps, table. **NNA**—Article which deals primarily with the general hydrographic regime includes seasonal precipitation maps, some rainfall means for various stations in 1932 and some rainfall graphs. *Subject Headings:* **1. Precipitation 2. Hydrography 3. Belgian Congo.**

3H–113 551.515.4(661)

§Weisse, L. and Barberon, J., **Note au sujet du grain du 28 au 30 juin 1933.** [Note on the subject of the squall June 29–30, 1933.] *Comité d'Études Historiques et Scientifiques de l'Afrique*

Occidentale Française, Publications, Ser. B, No. 3:47–61. **1937.** 2 plates (fold.), 6 figs. **DLC**—Detailed synoptic analysis made of this squall over French West Africa. Figures show daily isotherms and isallotherms at different hours during the period. *Subject Headings:* **1. Squalls 2. Synoptic analysis 3. French West Africa.**

3H–114 551.577.2(661)

Weisse, L., **Note sur la répartition mensuelle, journalière et horaire de la pluie à Dakar.** [Note on the monthly, diurnal and hourly distribution of rainfall at Dakar.] *Comité d'Étude Historiques et Scientifiques de l'Afrique Occidentale Française, Publications, Ser. B,* No. 3:71–75, **1937.** fig. (fold.), 4 tables. **DLC**—Rainfall observations, 1903–1933, are studied, and brief conclusions and summary tables are given of means of frequency, distribution, etc. *Subject Headings:* **1. Precipitation distribution 2. Dakar, French West Africa.**

1938

3H–115 551.579 551.582(675)

Baeyens, J., **Le climat et le pédo-climat du Bas Congo.** [The climate and the soil climate of the lower Congo.] (In: **Les sols de l'Afrique centrale, specialement du Congo belge.** [The soils of Central Africa, especially of the Belgian Congo.] Institut National pour l'Étude Agronomique du Congo Belge, Publications, Hors Série, **1938.** p. 104–146. 2 plates. English and German summaries.) **DLC**—The usual climatic elements are discussed in some detail, p. 104–124, with summarized data, rainfall map and diagrams. Pedo-climate, soil temperatures, moisture content and various contributing factors such as water retention, drainage, evaporation, etc. are discussed p. 124–143. *Subject Headings:* **1. Climatology 2. Soil climatology 3. Belgian Congo.**

3H–116 551.586:612

Foissy, A., **L'acclimatement de l'Européen en Afrique Occidentale Française.** [Acclimatization of the European in French West Africa.] *Annales de Physique du Globe de la France d'Outre-Mer,* 5:4–9, Feb. **1938.** 8 figs., refs. **NNA**—By using fairly simple climagrams, showing temperature and humidity for certain stations in French West Africa, author compares them to a specific, set European climate and points out the greater or lesser degree of ease of adaptation of the European to the different climates of French West Africa. Each climatic region is discussed and represented by a climagram. *Subject Headings:* **1. Acclimatization 2. French West Africa.**

3H–117 551.577.2(675)

*Goedert, Paul. **Die Niederschlagsverhältnisse von Belgisch-Kongo.** [Rainfall regime in the Belgian Congo.] Inaug.-Dis.—Heidelberg, **1938.** 33 p. maps, graphs, tables, 28 refs. **NNA.** Also appears separately as "Introduction . . ." to: "Les sols de l'Afrique centrale, specialement du Congo Belge." [Soils of Central Africa, especially of the Belgian Congo.] Institut National pour l'Étude Agronomique du Congo Belge, Publications, Hors Série, **1938.** 45 p. graphs, plates, tables, 29 refs. German and English summaries. **NNA**—Monthly and annual precipitation means are calculated for 131 stations of the Belgian Congo using observations 1927–1934. Particular features of Congo rainfall are considered in some detail: sources of data, regional and seasonal variations, distribution, periodicities, construction of rainfall maps, climatic classification, etc. Bibliography fairly general. *Subject Headings:* **1. Precipitation 2. Climatology 3. Belgian Congo.**

3H–118 551.582.2(667)

*Gold Coast. [Government], **Blue Book.** 1929–1938. **NN**—Annual contains meteorological observations; monthly and annual means are tabulated in each year's Blue Book (pagings are indexed), 1929–1938, for several stations in the country. *Subject Headings:* **1. Climatic data 2. Gold Coast.**

3H–119 551.557

Gouault, Jean, **Vents en altitude à Fort-Lamy (Tchad).** [Upper air winds at Fort-Lamy (Lake Chad).] *Annales de Physique de Globe de la France d'Outre-Mer,* 5(27):70–72, 82 91, June **1938.** 13 figs., ref. **NNA**—Graphs show results of first measurements of upper air winds at Chad, made in 1936–1937. Text reviews briefly general climatic conditions, seasonal winds, etc., and uses the present observations in brief discussion of atmospheric circulation over the whole continent. *Subject Headings:* **1. Upper air winds 2. Atmospheric circulation 3. Fort-Lamy, French Equatorial Africa.**

3H–120 551.513

Hubert, Henry, **Les masses d'air de l'Ouest Africain.** [Air masses of West Africa.] *Annales de Physique du Globe de la France d'Outre-Mer,* 5:33–64, **1938.** diags., graphs, refs. **NNA**—Extensive, theoretical and well-illustrated work in which the author collects, summarizes and extends

to all of West Africa, information that he has gathered since 1908 on atmospheric circulation above the region. Numerous schematic diagrams illustrate conditions found. Excerpts freely translated in *American Meteorological Society, Bulletin*, 24:351–354, Nov. 1943. *Subject Headings:* **1. Air masses 2. Atmospheric circulation 3. West Africa.**

3H–121 551.583

Jones, Brynmor, **Desiccation of the West African colonies.** *Geographical Journal*, London, 91(5):401–423, May **1938.** photos. **NNA**—Although several climatic changes have occurred in West Africa since the beginning of the Quaternary, no great alteration during historic time is evident and no danger exists that desiccation will soon impair the habitability of West Africa. Conditions of silting up of rivers, agriculture and land usage, wind and stream erosion, etc. are discussed. *Subject Headings:* **1. Climatic changes 2. Desiccation 3. Agricultural climatology 4. Nigeria 5. West Africa.**

3H–122 551.582.1

Klimatographische Witterungsschilderungen. . . . [Climatographic weather sketches. . . .] *Annalen der Hydrographie und Maritimen Meteorologie*, v. 64–66, **1936–1938. DLC**—The "sketches" consist individually of notes on weather conditions during particular periods or hours or days at particular locations. They are relatively brief and limited in scope, but do give details of conditions during the time they cover. Those pertinent to this bibliography are listed below chronologically. Authors, "sketch" number, translated titles and pagination in the periodical are included.

Wien, Karl: No. 59: [**Formerly, German East Africa.** Weather conditions in a coastal region, in Uluguru, Dodoma, Iringa Highlands and the Oldeani.] *Ibid.*, 64:115–118, **1936.** Also in same vol.: No. 60, p. 118–120, by Grass; No. 71, p. 319–320, by Grass and No. 78, p. 453–454, by Hans Stein.

Schirrmacher, W.: No. 66: [**Cameroons.** Weather conditions at the end of the harmattan season in Belo-Bekóm, March 5, 1935.] *Ibid.*, 64:226–227, **1936.**

No. 70: [**Cameroons.** Conditions in a thunderstorm during the transition period between the dry and rainy seasons in Bum, March 31, 1935.] *Ibid.*, 64:274–275, **1936.**

No. 73: [**Cameroons.** Beginning of the harmattan season in Belo-Bekóm, Nov. 2, 1935.] *Ibid.*, 64:374, **1936.**

Dinklage, Max Julius: No. 82: [**Liberia.** Weather conditions on the days of transition between rainy and dry seasons in Monrovia, Nov. 27–29, 1934.] *Ibid.*, 64:494–495, **1936.**

Sieber, J.: No. 92: [**Cameroons.** Weather conditions on days of the summer rainy season in Ndu, June 28 and Aug. 9, 1936.] *Ibid.*, 65:92–93, **1937.**

No. 95: [Conditions in the middle of the dry, harmattan season in Ndu, Jan. 15, 1937.] *Ibid.*, 65:189–190, **1937.**

Lamparter, Ernst: No. 98: [**Cameroons.** Conditions at the beginning of the big rainy season in Mbengwi, Sept. 21, 1936.] *Ibid.*, 65:291–292, **1937.**

Schirrmacher, W. and Freidrich, H.: No. 100: [**Cameroons.** Conditions on days of the dry season in the Cameroons mountains.] *Ibid.*, 65:391–392, **1937.**

Sieber, J.: No. 109: [**Cameroons.** Conditions at the end of the rainy season in Ndu, Oct. 22, 1936.] *Ibid.*, 66:140–141, **1938.**

Dinklage, M. J.: No. 119: [**Liberia.** Conditions during the transition period between the rainy and dry seasons in Monrovia, Nov. 30–Dec. 15, 1934.] *Ibid.*, 66:560–563, **1938.**

Hoffmann, B.: No. 121: [**Fernando Poo.** Conditions on a day during the transition from the dry to the rainy season in Belebu.] *Ibid.*, 66:593, **1938.**

Friedrich, H.: No. 122: [**Cameroons.** Typical conditions on days of the rainy season in the Cameroons mountains, Aug. 31–Sept. 6, 1937.] *Ibid.*, 66:594, **1938.**

Sieber, J.: No. 134: [**Cameroons.** Conditions during the last third of the rainy season in Ndu, Sept. 27, 1938.] *Ibid.*, 67:400, **1939.**

Hoffmann, B.: No. 137: [**Fernando Poo.** Conditions during the dry season (Dec. Feb.) in Belebu, Feb. 18, 1939.] *Ibid.*, 67:501–502, **1939.** *Subject Headings:* **1. Climatological sketches 2. Cameroons 3. Liberia 4. Fernando Poo. I. Wien, Karl II. Schirrmacher, W. III. Dinklage, Max Julius IV. Sieber, J. V. Lamparter, Ernst VI. Friedrich, H. VII. Hoffmann, B.**

3H–123 551.521.1

*Lapayre, Louis, **Mesure de la radiation solaire en Afrique équatoriale.** [Measurement of solar radiation in equatorial Africa.] (In: **Année polaire Internationale, 1932–33, Participation Française.** v. 2. Paris, **1938.** p. 125–151. 10 figs. 7 tables.) **DWB**—Report is made of solar radiation measurements, commenced March 1933 at Bangui meteorological station, French Equatorial Africa. Instruments and methods reviewed. Effect of clouds on solar radiation noted and cloud photos included. Airplane measurements tabulated for different altitudes and discussed. Other tables contain values for global solar radiation, direct solar radiation, red and yellow filtered solar radiation

(1933) and daily insolation measurements Aug. 1932 July 1933. *Subject Headings:* **1. Solar radiation 2. Bangui, French Equatorial Africa.**

3H–124 551.582.2(669)

*Nigeria [Government], **Blue Book, 1935-1938. NNA, NN**—Section 29 of Blue Book annually contains monthly means from observations made by the British West African Meteorological Service during that year. (Earlier Nigeria Blue Books do not contain meteorological data.) *Subject Headings:* **1. Climatic data 2. Nigeria.**

3H–125 551.582.2(669)

*Nigeria. Survey Dept., **Annual Report . . . 1925–1938.** Title varies. tables. **NN, NNA**—Climatic data from various stations of Nigeria were included annually in this periodical. Although publication continues, issues after 1938 contain no material of meteorological interest. *Subject Headings:* **1. Climatic data 2. Nigeria.**

1939

3H–126 551.582(665)

Foissy, A., **Deux ans d'observations météorologiques à Kouroussa (1935–1936).** [Two years of meteorological observations at Kouroussa (1935–1936).] *Annales de Physique du Globe de la France d'Outre-Mer*, 6:33–47, **1939.** figs. **NNA**—The various climatic elements of this region of French Guinea, 1935–36, are discussed. Includes upper air conditions. Data, surface and upper air, are given in numerous diagrams. *Subject Headings:* **1. Climatology 2. Kouroussa, French Guinea.**

3H–127 551.577

*Fraselle, E., **Contribution à la connaissance des météores aqueux et aériens du Ruanda-Urundi (plateau des grands lacs africains).** [Contribution to the knowledge of hydrometeors and atmospheric phenomena of Ruanda-Urundi, plateau of the great African lakes.] Liège, **1939.** 25 p. 4 maps, 2 diagrs., tables, 14 refs. **DWB**—General geographical conditions described. Precipitation conditions are taken up: annual amounts in diverse sections of region; influence of the active volcanoes of the Virunga Mts.; dry season; and general rainfall regimes. In the second part of the work winds are discussed: general atmospheric circulation at the altitude of the trades; relations existing between atmospheric circulation of the region and atmospheric centers of action; and dominant wind characteristics. Summary rainfall tables for Central and East Africa and a rather general bibliography are appended. *Subject Headings:* **1. Precipitation 2. Winds 3. Atmospheric circulation 4. Ruanda-Urundi.**

3H–128 551.582.2

*Gambia. [Government], **Blue Book . . .** Bathurst, **1920–1939. NN**—Annual contains meteorological report in summarized form for each year as well as various other statistics. *Subject Headings:* **1. Climatic data 2. Gambia.**

3H–129 551.582.2(665)

*Gambia. Dept. of Agriculture, **Annual Report.** Title varies. Bathurst, **1891–1939. NN**—Brief climatic tables summarize each year's observations at several stations. Edition of 1926 contains summarized data for 1917-1926 as well as a rainfall graph for that period. *Subject Headings:* **1. Climatic data 2. Gambia.**

3H–130 551.582.2(6)

Great Britain. Hydrographic Office, **Africa pilot . . .** 9th–10th ed. London, **1939.** 3 v. **DWB**—Pilots contain general sailing directions and summarized climatic data. Pt. 1 includes the Azores, Madeira, Canary and Cape Verde Islands and the west coast of Africa from Cape Spartel to Calabar River. General discussion on meteorology p. 28–44; meteorological tables p. 441–452. Pt. 2 includes the west coast of Africa from Rio del Rey to Cape Kangklip, the islands of the Bight of Biafra, Ascension, St. Helena, the Tristan da Cunha group and Gough island. Notes on general meteorology of region p. 27–43; meteorological tables p. 318–329. Means of the usual elements are tabulated for various stations for differing periods of time. Pt. 3 is concerned with the east coast of Africa. *Subject Headings:* **1. Climatic data 2. West African Coast 3. Cape Verde Islands.**

3H–131 551.582(666)

Harley, G. W., **Roads and trails in Liberia.** *Geographical Review*, New York, 29:447–460, **1939.** Climate p. 458, 460. 2 figs. **NNA**—A graph shows rainfall curves: maximum (1928), six-year mean, and minimum (1929); another shows daily barometer readings with relations to rainfall, 1928, at Ganta. A brief sketch of "the weather at Ganta" is given. *Subject Headings:* **1. Climatology 2. Liberia.**

3H–132 551.577.37

Hubert, Henry, **Les pluies torrentielles en Afrique occidentale Française.** [Torrential rainfall in French West Africa.] *Annales de Physique du Globe de la France d'Outre-Mer*, 6:161–167, Dec. **1939.** figs. (p. 169–173), 2 tables, 3 refs. **NNA**—Characteristics, frequency, distribution, etc., of torrential rains (at least 30 mm in 24 hr) are analyzed from two years observations, 1932–1933. Table gives observations by station. Charts show results graphically. *Subject Headings:* **1. Rainfall extremes 2. French West Africa.**

3H–133 551.583

†Laforgue, Pierre, **Essai sur les causes du dessèchement de l'Aoukar du Hodh (Mauritanie).** [Essay on the causes of the desiccation of the Aoukar of the Hodh (Mauritania).] *Société de Géographie et d'Archéologie d'Oran, Bulletin*, 60:145–155, **1939.** 3 figs., 25 refs. **NNA**—Geological evidence of climate change and increasing aridity discussed. *Subject Headings:* **1. Desiccation 2. Climatic changes 3. Mauritania, French West Africa.**

3H–134 551.588.6

Moor, H. W., **The influence of vegetation on climate in West Africa, with particular reference to the protective aspects of forestry in the Gold Coast.** *Oxford University. Imperial Forestry Institute, Institute Paper* No. 17, **1939.** 15 p. 65 refs. **NNA**—The functions of forests are noted and analyzed with particular regard to effects on regional and local climate and on conservation of water and soil in West Africa, principally in the Gold Coast. *Subject Headings:* **1. Climatology 2. Forest influences 3. Gold Coast 4. West Africa.**

3H–135 551.506.1(66)

British West Africa. Meteorological Service, **Annual report for the year 1938.** Lagos, Nigeria, **1939.** 15 p. Unchecked. **GB-MO**—The preface includes notes on inception and functions of the service inaugurated at Mr. Entwistle's suggestion in June 1937 by the four colonies: Nigeria, Gold Coast, Sierra Leone and Gambia. *Subject Headings:* **1. Meteorological services 2. Nigeria 3. Gold Coast 4. Sierra Leone 5. Gambia.**

3H–136 551.582(661) 551.588.3

Scaëtta, H., **Les types climatiques de l'Afrique occidentale française; leur rapport avec l'évolution du sol tropical.** [Climatic types of French West Africa; their relation to evolution of tropical soil.] *La Météorologie*, Jan.–Feb. **1939.** p. 39–48, 2 figs., 6 refs. **DWB**—Effects of tropical climatic factors on the development of soils, especially laterite, in this region from the Gulf of Guinea to 12°N are studied. Rainfall and temperature diagrams for several stations are included, and distribution of laterite and other soil types shown in accordance with climatic factors. *Subject Headings:* **1. Climatology 2. Soil climatology 3. Laterite 4. French West Africa 5. Guinea Coast Region.**

3H–137 551.515.4(6)

Suckstorff, G. A., **Die Ergebnisse der Untersuchungen an tropischen Gewittern und einigen anderen tropischen Wettererscheinungen.** [Results of research on tropical thunderstorms and various other weather phenomena.] *Beiträge zur Geophysik*, 55:138–185, **1939.** 33 figs., 2 tables, 8 refs. **NNA**—Conditions of tropical thunderstorms are determined. Work includes consideration of several thunderstorm occurrences in tropical West Africa and bordering Atlantic, as well as for northwestern and southern Africa. Tropical thunderstorms are compared to those of Europe. *Subject Headings:* **1. Thunderstorms 2. Tropical regions 3. West African Coast 4. Europe.**

1940

3H–138 551.552(665.8)

Fernando, Buroni, **Sulle correnti aeree al suolo in alcune isole dell'archipelago del Capo Verde.** [On surface winds in certain islands of the Cape Verde Archipelago.] *Rivista di Meteorologia Aeronautica*, 4(3):45–52, **1940.** 4 figs., tables. **DWB**—Wind data 1921 1924 are analyzed with brief summary tables, velocity diagrams and seasonal wind roses. *Subject Headings:* **1. Winds 2. Cape Verde Islands.**

3H–139 551.585(66)

Hubert, Henry, **Types de climats des colonies françaises de l'Afrique tropicale.** [Climatic types in French colonies of tropical Africa.] *Association de Géographes Français, Bulletin*, No. 128/129:26–31, March/April **1940.** 2 tables. **NNA**—General description given of a classification system and determination of the several climatic regions of French West and Equatorial Africa and

Madagascar. No climatic data or diagrams are reproduced. *Subject Headings:* **1. Climatic types 2. French West Africa 3. French Equatorial Africa 4. Madagascar.**

1941

3H–140 551.577.2(675)

***Chutes de pluie au Congo Belge et au Ruanda-Urundi pendant l'année . . . (1927–1941).** [Rainfall in the Belgian Congo and Ruanda-Urundi during . . . (1927–1941.)] *Belgium. Direction Générale de l'Agriculture. Bulletin Agricole du Congo Belge*, 21(3):659–663, **1930**; 22(4):510–517, **1931**; 25(4):567–576, **1934**; 26(4):480–491, **1935**; 28(2):280–298, **1937**; 28(3):450–470, **1937**; 29(2):280–303, **1938**; 29(3):534–561, **1938**; 30(1):73–105, **1939**; 30(3):421–458, **1939**; 32(1):12–58, **1941**; 32(4):591–626, **1941**. **NNA**—Monthly and annual totals, maxima, and days of rain at the stations of each province are tabulated. Summaries for varying periods, 1910–1925, for several stations of the Congo. *Ibid.*, 17(1):275–289, March 1926. *Subject Headings:* **1. Precipitation 2. Climatic data 3. Belgian Congo 4. Ruanda-Urundi.**

3H–141 551.513:551.557(6)

†*Ekhart, Erwin. **Die Strömung der Luft über Afrika und den angrenzenden Gebieten; ein Beitrag zur Kenntnis der allgemeinen Zirkulation.** [Air flow over Africa and the neighboring regions; a contribution to the knowledge of the general circulation.] *Germany. Reichsamt für Wetterdienst, Forschungs- und Erfahrungsberichte, Reihe A*, No. 10, **1941**. 19 figs., plus 11 appended, tables, 45 refs. **DWB**—General atmospheric circulation over Africa is studied. A clear picture of wind flow conditions, winter and summer, is derived from upper wind observations. Mean wind flow charts to heights of 8 or 10 km are constructed by means of graphs and cross sections of zonal and meridional components. Horizontal temperature changes are inferred from vertical wind changes. Author considers the characteristic parts played by the harmattan, trades, antitrades and monsoons, their effects and season of occurrence. Details of associated sandstorms are discussed. A brief survey of aeronautical climatological applications is included. *Subject Headings:* **1. Atmospheric circulation 2. Upper air winds 3. Africa.**

3H–142 551.553.6 551.552(665.8)

*Martinozzi, L., **Contributo alla conoscenza del vento al suolo all'Isola del Sale (Arcipelago di Capo Verde).** [Contribution to knowledge of surface winds on Sal island, Cape Verde Islands.] *Rivista di Meteorologia Aeronautica*, 5(1):35–54, **1941**. 10 figs., 9 tables, 7 refs. **DLC**—Two years wind observations at location are analyzed to determine monthly and annual distribution of frequency, velocity and resultant winds. Summary data, 1928–1933, wind roses, and analysis of winds according to monthly synoptic conditions over the North Atlantic are included. *Subject Headings:* **1. Surface winds 2. Sal, Cape Verde Islands.**

3H–143 551.582(675)

*Michel, E., **Météorologie du Congo Belge et du Ruanda-Urundi.** [Meteorology of the Belgian Congo and of Ruanda-Urundi.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 32(4):587–639, Dec. **1941**. maps, tables. **NNA**—Work is arranged in four sections: 1) List of meteorological stations; 2) Tables of rainfall 1939 for numerous stations, monthly and annual totals, maxima and days of rain; 3) Raintall means for varying numbers of years for stations at different altitudes; 4) Maps of the meteorological network of the region. *Subject Headings:* **1. Climatology 2. Precipitation 3. Meteorological stations 4. Belgian Congo 5. Ruanda-Urundi.**

3H–144 551.582(663)

Portig, W., **Meteorologische Beobachtungen in Bathurst (Westafrika).** [Meteorological observations at Bathurst (Gambia, West Africa).] *Annalen der Hydrographie und Maritimen Meteorologie*, 69:109–113, **1941**. **NN, DLC**—Report is made of some observations kept aboard a German ship anchored in mouth of Gambia River 1934–1939. Some results discussed with diagrams, but no tables. Upper winds observed but no details given. *Subject Headings:* **1. Climatology 2. Bathurst, Gambia.**

1942

3H–145 551.582(672) 551.572(672)

*French West Africa. Service Météorologique, **Mementos.** Dakar, **1941–1942.** Listed by number, title and date as follows:

Memento No. 1. **Organisation général.** [General organization.] 1941. Unchecked.

No. 6A. **Types de temps, A.O.F.** [Weather types of French West Africa.] 1941. 39 p. figs. **DWB**—Types of weather are analyzed by season, synoptic conditions, and region. For the

dry season four weather types are included under normal situation; five under conditions of harmattan on the coast; four under regime of a depression. For the rainy season: five for summer thunderstorm situations; five for the V-type depression conditions; and two for monsoon conditions. Notes on the characteristics of the seasons and of the dry haze are included.

§No. 6B. **Prévision de temps.** [Weather forecasting.] 1942. 95 p. 122 figs. **DWB**—Contents includes extensive and detailed consideration of the general circulation of the atmosphere; of aerial currents in French West Africa; of perturbations; of types of weather; of general forecasting; and of local forecasting.

*No. 7A. **Moyennes.** [Means.] 1941. 137 p. extensive tables. **DWB**—Stations in each region of French West Africa are listed. Statistics from each are tabulated at length for all the usual climatic elements. Observations 1931–1940, are used for rainfall, and, 1936–1940, for temperature, pressure, humidity (including vapor tension and evaporation), cloudiness (including visibility and wind), and insolation.

*No. 7B. **Fréquences.** [Frequencies]. 1942. 158 p. extensive tables. **DWB**—Tables of frequencies of rain, squalls, thunderstorms, lightning, hail, fog, haze, dew, clear and cloudy skies; frequency of horizontal visibility, and of surface winds for the numerous stations of all regions of French West Africa.

No. 7C. **Cartes des moyennes.** [Charts of means.] 1942. 102 p. extensive charts. **DWB**—Extensive charts have been constructed from the climatological data furnished in No. 7A above.

*No. 8. **Vent en altitude.** [Winds aloft.] 1941. 216 p. extensive tables. **DWB**—Mean frequencies of upper air winds are calculated from observations made in 1936, 1937, and 1938 at numerous stations of French West Africa. Values are tabulated by directions, velocities of winds at the levels: surface, 500, 1000, 2000, 3000 and 4000 meters above sea level. Other *Mementos*, Nos. 8A–8F (unchecked), give wind roses for the various altitudes. *Subject Headings:* **1. Climatology 2. Climatic data 3. Synoptic studies 4. Upper air winds 5. French West Africa. I. Welter, L.**

3H–146 551.577.2(675)

Michel, E. and Vandenplas, A., **Carte des stations météorologiques et des hauteurs annuelles normales des pluies exprimées en millimètres pour la période 1930–1939.** [Map of meteorological stations and annual rainfall normals in mm for 1930–1939.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge, 33*(1):176, March **1942.** map (fold.). **NNA**—Rainfall chart of Belgian Congo and Ruanda-Urundi shows annual isohyets and locations of stations. See also *ibid.*, 30(4):700–732, 1939, for an alphabetical list (complete at that time) of agricultural meteorological stations of region noting location, altitude, equipment, etc., but no data. *Subject Headings:* **1. Precipitation charts 2. Meteorological stations 3. Belgian Congo 4. Ruanda-Urundi.**

3H–147 551.582(675)

Robert, Maurice, **Le Congo physique.** [Physical features of the Congo.] 2nd ed. rev. Brussels, **1942.** 369 p. 27 plates, 62 figs., tables, refs p. 341–348. **NNA**—This work consolidates and sums up in general all earlier works available to the author on the physical conditions of this region of Central Africa. Chap. 5, p. 205–242, deals with climatology. General pressure, wind and precipitation regimes of the continent are considered, and the tropical climates in particular, that is the equatorial, the Sudanese and Senegalese, and, finally, that of the Congo itself and its different zones. Effects of Congo climate on European colonization are noted. Paleoclimatology of the region is also considered, as well as hydrology, hydrography, geology, minerals, flora, fauna, etc. The extensive bibliography is listed by author, not subject; list of author's earlier studies on Central Africa included. *Subject Headings:* **1. Climatology 2. Paleoclimatology 3. Hydrology 4. Belgian Congo 5. Africa.**

3H–148 551.586

*Semmelhack, Wilhelm, **Physiologische Klimakarte von Kamerun und den Nachbargebieten.** [Physiological climatic chart of Cameroons and vicinity.] *Reichskolonialbund, Berlin. Gruppe Deutscher Kolonialwirtschaftlicher Unternehmungen, Mitteilungen*, 5:1–60, **1942.** 12 figs., 4 plates (in pocket), 9+tables. **DLC.** Review by E. Reichel in: *Meteorologische Zeitschrift*, 60:34–35, 1943. **DWB**—Author investigates the "Schwülegrenze" or sultriness limit of the region, particularly effects of temperature and humidity on the European, using observational material from 117 stations between 0° and 13°N, 3° to 18°E. Climagrams are constructed and a physiological climatic chart of the region including Nigeria, Cameroons and Congo (to the equator). Short tables include values for temperature, humidity, precipitation, cloud and sunshine duration. *Subject Headings:* **1. Physiological climatology 2. Sultriness 3. Cameroons 4. Nigeria 5. Belgian Congo. I. Reichel, E.**

3H–149 551.586:58(675)

Thomas, René, **Les limites climatiques de la cuvette congolaise et le système forestier Bantou envisagés sous l'angle de protection de la foret.** [Climatic limits of the Congo Basin and the Bantu forestry system from the forest-protection viewpoint.] *Belgium. Direction Generale de l'Agriculture, Bulletin Agricole du Congo Belge*, Brussels, 33(4):486–499, Dec. **1942.** map (fold.) 13 refs. **NNA**—Article is concerned principally with problems of the Congo forests, but the climatic boundaries of the region, based on duration of dry season and aridity index, are defined and shown on map. No data. *Subject Headings:* **1. Bioclimatology 2. Forests 3. Belgian Congo.**

3H–150 551.582(66)551.586

*§U. S. Air Weather Service, **Climate and weather of the West coast of Africa and the eastern Atlantic Islands with appendix on bioclimatology of coastal regions of the southern North Atlantic and the South Atlantic.** Vol. 2, No. 3, 1942. map, 12 figs., diagrs., tables. **DLC**—Detailed discussion of the climate of the coastal area of Africa from the southern boundary of Sierra Leone north to Strait of Gibraltar is given, dividing the region into the drier section above, and the wetter below 15°N. lat. All climatic elements as well as air mass analysis, climatic types, atmospheric circulation, upper air winds, thunderstorms and "tornadoes," cloudiness, ceilings, visibility, fogs, haze and dust along with rather brief but representative data, are considered for the coastal area of the continent and the islands of the Eastern Atlantic. (Same as *MAB* 3A-230, Jan. 1952.) *Subject Headings:* **1. Climatology 2. Aeronautical climatology 3. Bioclimatology 4. Canary Islands 5. Cape Verde Islands 6. Madeira 7. West African Coast.**

1943

3H–151 551.515.3(66):551.509.31

Archbold, J. W., **Frontal analysis over Central and West Africa.** *Meteorological Magazine*, Lagos, p. 1–10, April **1943.** 4 plates. And: [Note on results of constructing convergence charts April–May 1943.] *Ibid.*, May 1943. 7 p. 19 figs. **GB-MO**—The aim is to show that weather of tropical Africa should be studied by air mass and frontal analysis. (General air currents after Hubert and Solot). Interaction between Mediterranean and northern tropics is discussed. A frontal surface between harmattan and SW monsoon is analyzed, and perturbations discussed including the African "tornado" which is regarded as a frontal phenomenon. *Subject Headings:* **1. Frontal analysis 2. Convergence 3. West Central Africa.**—*C.E.P.B.*

3H–152 551.582.2(675)

*Belgian Congo. Service des Télécommunications. Section d'Aeronautique, **Eléments climatologiques de quelques stations météorologiques au Congo Belge 1935–1940.** [Climatic elements of some meteorological stations in the Belgian Congo 1935–'40.] Leopoldville, **1943.** [n.p.] diagrs. tables. **DWB**—Contains unedited monthly values for the various elements, averaged 1935–1940, for several stations in the Belgian Congo network, along with charts showing rainfall and temperature curves. *Subject Headings:* **1. Climatic data 2. Belgian Congo.**

3H–153 551.509.312(66)

Hare, F. Kenneth, **Pressure distribution and the synoptic chart in Central and West Africa.** *Great Britain. Meteorological Office. Synoptic Div., Memoir* No. 54, 1943. 4 p. table. Mimeographed. **GB-MO**—Pressure gradients are small (rarely exceed 1 mb/100 km). Shallow depressions form on intertropical front, no anticyclones. Use of synoptic charts is favored. Relations of winds to gradient set out and steep slope of frontal surfaces discussed. *Subject Headings:* **1. Synoptic meteorology 2. West Africa.**—*C.E.P.B.*

3H–154 551.555.8

Hubert, Henry, **Renseignements sommaires sur les vents de sable en Afrique Occidentale Française.** [A summary of knowledge of the sand and dust storms of French West Africa.] *Annales de Physique du Globe de la France d'Outre-Mer*, 1(1):29–31, Feb. **1943.** Trans. by Mrs. A. Zawodski in: *American Meteorological Society, Bulletin*, 24(6):243–246, June 1943. 2 figs., ref. **DWB**—Differences between the dry haze and sandstorms of French West Africa are enumerated, and the principal characteristics such as formation, accompanying winds, forecastability, etc. of sand storms are given. See also: Lapayre, [**Sandstorms in French Equatorial Africa.**] Same, *Annales de Physique . . .* p. 28–29. *Subject Headings:* **1. Sandstorms 2. Haze 3. French West Africa 4. French Equatorial Africa.**

3H–155 551.582(669)

Nigeria. Meteorological Service, **Summary of normal weather conditions in Lagos area during April-Nov., Jan.** *Meteorological Magazine*, Lagos, March 1943–Dec. **1943.** **GB-MO**—More or

less regular monthly notes based on observations for 1937–1942 give rainfall, days, number and time of squalls, diurnal variation of rain, surface and upper winds, cloud and visibility. *Subject Headings:* **1. Climatology 2. Lagos, Nigeria.**—*C.E.P.B.*

3H–156 551.582(665.8)

Pereira Natário, Agostinho, **O clima de S. Vincente.** [Climate of St. Vincent.] *Cape Verde Islands. Serviços de Estatística, Boletim Econômico*, No. 1, **1943.** 22 p. tables. **NN**—Mostly descriptive account with small amount of summary data, 1912–1942. *Subject Headings:* **1. Climatology 2. Cape Verde Islands.**

3H–157 551.501.9 551.582(665.8)

*Pereira Natario, Agostinho, **Subsidios para o estudo do clima de Cabo Verde.** [Contribution to a study of the climate of Cape Verde (Islands).] *Cape Verde Islands. Servicos de Estatística. Boletim Econômico*, No. 2, 1943. 23 p. tables. **NN**—Includes notes on positions, etc., of stations with some means for 1930–1939 for three of the stations. *Subject Headings:* **1. Climatology 2. Meteorological stations 3. Cape Verde Islands.**

3H–158 551.577.2(675)

Pfalz, Richard, **Die Regenverteilung in Belgisch-Kongo; Bemerkungen zu einer neuen Niederschlagskarte.** [Rainfall distribution in the Belgian Congo; remarks on a new precipitation chart.] *Petermanns Geographische Mitteilungen*, 89(9–10):263–268, Sept.–Oct. **1943.** 2 charts, 6 diagrs., tables, 11 refs. **NNA**—A new precipitation chart is constructed supplementing that of Michel and Vandenplas (1938), along with six climagrams for different locations, using observations, 1936–1938. The observations by region are discussed and some summary rainfall totals and climatic means are briefly tabulated. Construction of the new map is discussed. *Subject Headings:* **1. Precipitation distribution 2. Precipitation charts 3. Belgian Congo.**

3H–159 551.513:551.582(624)

Solot, Samuel B., **The meteorology of central Africa.** Accra, Gold Coast, Nov. **1943.** 59 p. 55 figs., appends. *U. S. Air Weather Service, Research Report* 105–50. **DWB**—Comprehensive and detailed survey made principally of the weather of the Anglo-Egyptian Sudan. The chapters take up general circulation in the lower troposphere; air mass properties; the intertropical front; haze, dust and sandstorms; harmattan haze; rainfall in the Sudan; and, lastly, dynamic climatology (which is an interpretation of climatological data in terms of the circulation) in an attempt to broaden the range of study by classification of the region into five homogeneous weather zones and by brief discussion of the problems of each zone. Results of study are generalized into five fundamental principles of tropical meteorology. Two appendices are included: one on suggestions in map analysis; the other on the techniques employed in this study, as well as typical synoptic and adiabatic charts, isopleths, flow charts, comparative curves and other interesting schematic diagrams. (Same as *MAB* 2J-215, Oct. 1951.) *Subject Headings:* **1. Climatology 2. Atmospheric circulation 3. Tropical meteorology 4. Sudan 5. Central Africa.**

3H–160 551.582(672, 665.8):629.13

*U. S. Hydrographic Office, **Naval air pilot; West Central Africa (including Cape Verde, Ascension, and St. Helena Islands); weather summary.** Washington, D. C., **1943.** 122 p. 38 charts, 6 tables (extensive). U. S. H.O. No. 261, Supplement "C." **NNA**—Includes 17°N to 10°S and about 15°E to 20°W. Contents contain sections on: atmospheric pressure; average surface wind drift direction, constancy and force; ocean winds; winds along the Dakar-Bathurst to Natal air routes; distribution of wind forces; gales; tropical cyclones; thunderstorms and African tornadoes; visibility; cloudiness; air temperature at sea; direction of middle cloud movement; average cloud cover; factors affecting visibility; frequency of rain and drizzle, thunderstorms and squalls; coastal and continental meteorology; harmattan; island climates; upper air winds; and extensive meteorological tables. *Subject Headings:* **1. Climatology 2. Aeronautical climatology 3. French West Africa 4. West Africa 5. Cape Verde Islands 6. St. Helena Island 7. Ascension Island.**

3H–161 551.577.2(675)

†*Vandenplas, A., **La pluie au Congo Belge.** [Rainfall in the Belgian Congo.] *Belgium. Institut Royal Météorologique, Mémoires*, v. 16, **1943.** 130 p. 14 charts (fold.), 14 tables, 123 refs. Summaries in Dutch and German p. 122–127. **NNA.** Also in: *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 34:275–396, 1943. **NNA**—Broad comprehensive work consolidating as much information on Congo precipitation as then available. History and methods of the Congo climatic stations noted. Annual distribution of rainfall discussed taking up nine distinctive regions. Monthly rainfall amounts studied and charts drawn; meteorological and

topographical influences noted. Variations, frequencies and intensities of rainfall are discussed, duration of the dry season and the rainfall regime in general. Folded charts are appended showing monthly and annual rainfall distribution. A thorough and extensive alphabetical, unannoted bibliography is included, dealing almost exclusively with climate of the Belgian Congo and including very early as well as recent works. *Subject Headings:* **1. Precipitation 2. Climatology 3. Belgian Congo.**

1944

3H–162 551.506.1(665.8)

*Cape Verde Islands. Serviços de Estatistica, **Meteorologia e climatologia; resumo das observações efectuadas nos postos oficias da colonia . . . 1935–1944.** [Meteorology and climatology; summary of observations at official stations . . . 1935–1944.] extensive tables. **NN**—Periodical appears annually and presents complete detailed records in tables of meteorological observations from the Central Meteorological Station at S. Vincente and from numerous first and second order stations of the islands. One section presents monthly summaries of pilot balloon aerological soundings. Large folded charts give rainfall values for every station for each year. Discontinued in 1945. Later issues are more extensive. *Subject Headings:* **1. Observational data 2. Climatic data 3. Cape Verde Islands.**

3H–163 551.582(66):629.13

§Great Britain. Meteorological Office, **A pilot's primer of West African weather.** London, **1944.** 30 p. 13 figs. M.O. 469(A.P.3092). **DWB**—Contents includes chapters on: seasonal weather in West Africa including consideration of intertropical front, two main W. African winds, the weather zones of W. Africa, weather over the sea, the doldrums, upper winds, line squalls, visibility and harmattan haze, monsoon rain, meteorological conditions in the Dakar-Canary Islands region, and the synoptic weather map in West Africa. *Subject Headings:* **1. Aeronautical climatology 2. West Africa.**

3H–164 551.515.1(263,66)

§Piersig, Walter, **The cyclonic disturbances of the sub-tropical eastern North Atlantic.** *American Meteorological Society, Bulletin*, 25(1):2–16, Jan. **1944.** 20 figs., 10 tables, refs. **DWB**—Adapted from Parts 2 and 3 of PIERSIG's work (in German) in: *Aus dem Archiv der Deutschen Seewarte*, 54, No. 6, 1936. Study made from the "Hoffmeyer charts" (1881–1911) of types and behavior of pressure disturbances which form in the trade-wind belt of the eastern North Atlantic (off the west coast of Africa 5° to 25°N. to 30°W.) Four types of disturbances are determined and classified. Their tracks and monthly frequencies, duration and repetition are discussed. Detailed synoptic analysis of an example is given. *Subject Headings:* **1. Atmospheric disturbances 2. Cyclonic storms 3. Eastern Atlantic 4. West African Coast.**

3H–165 551.582(667)

Wise, Colin G., **Climatic anomalies on the Accra Plain.** *Geography*, London, 29:35–38, June **1944. NNA**—A fairly brief, but comprehensive summary is made of the climate of this strip of the Gold Coast from Cape Three Points to near the boundary of French Togo. No data are tabulated, but some means are included in text. Rainfall, temperature, winds, ocean currents, fogs, and possible explanation of the anomalies are considered. *Subject Headings:* **1. Climatology 2. Climatic anomalies 3. Accra Plain, Gold Coast.**

1945

3H–166 551.582.2(675)

*Belgian Congo. Service des Télécommunciations. Section d'Aéronautique, **Valeurs mensuelles de certains elements météorologiques.** [Monthly values of certain meteorological elements.] 1940–**1945.** tables. Holdings: Sept. 1940–Dec. 1941; Aug. 1942–June 1945; Oct.–Dec. 1945. **DWB**—Monthly collections of climatic data including pressure, temperature and humidity means, surface wind direction and velocity, visibility and low cloud frequencies. *Subject Headings:* **1. Climatic data 2. Belgian Congo.**

3H–167 551.582(675)

†*Bernard, Étienne, A., **Le climat écologique de la Cuvette centrale congo-laise.** [The ecological climate of the central Congo Basin.] Institut National pour l'Étude Agronomique, Publications, 1945. 240 p. 36 figs., 70 tables, 176 refs. **DWB**—An analytical and scholarly work on the climate of the northern part of the Belgian Congo, in which the author presents a vast amount of well-organized data (considering the short time the region has been developed), including original charts, maps and diagrams illustrating the courses and distribution of the various climatic elements. Geographic factors, the regional meteorological network, and all aspects of the problem of radiation are

considered at length. A series of chapters on various weather and climatic elements is included. Throughout, emphasis is laid on the physical factors of climate as they affect vegetation, on circulation (global and local) and on other synoptic considerations. An excellent bibliography and an appendix consisting of a tabulated comparison of six kinds of actinometers and photometers complete this masterful work. (See also *MAB* 8–110, Aug. 1950.) Reviews by W. H. Hogg, *Meteorological Magazine, London*, 77:236–237, 1948; by V. Conrad, *American Meteorological Society, Bulletin*, 29:476–477, 1948; by W. Reuter, *Wetter und Leben*, 1:252, 1948. *Subject Headings:* **1. Climatology 2. Ecology 3. Congo Basin, Belgian Congo. I. Hogg, W. H. II. Conrad, V. III. Reuter, W.**—*M.R.*

3H–168 551.515:551.582(669)

§Hamilton, R. A. and Archbold, J. W., **Meteorology of Nigeria and adjacent territory.** *Royal Meteorological Society, Quarterly Journal*, 81(309–310):231–264, July–Oct. **1945.** 7 figs., 4 charts. **NNA**—Work is divided into three parts. The first describes the air masses and prevailing winds and the characteristics of four weather zones. The second discusses the harmattan, dust haze, dust storms and the question of forecasting the onset and clearing of dust haze. Part three deals with instability phenomena in the form of disturbance lines and local thunderstorms; a theory of their mechanism is put forward which agrees well with observed phenomena. Tephigrams of the aerial ascents of Oct. 19, 1943 are plotted. *Subject Headings:* **1. Climatology 2. Harmattan 3. Atmospheric disturbances 4. Nigeria.**

3H–169 551.582(667) 551.579

Junner, N. R. and Bates, D. A., **Reports on the geology and hydrology of the coastal area east of Akwapim Range.** *Gold Coast. Geological Survey, Memoir* No. 7, 1945. 23 p. map (fold.), 3 tables. **NNA**—Brief comments on climate and vegetation are included in Introduction, and some summary data for rainfall, temperature and surface wind are tabulated in appendix. *Subject Headings:* **1. Climatology 2. Hydrology 3. Geology 4. Akwapim Range, Gold Coast.**

3H–170 551.506.1(665.8,665.7)

*Portugal. Direcção Geral de Fomento Colonial. Serviço Meteorológico. **Anais Meteorológicos das Colonias,** v. 5–27, 1914–1941. **NNA.** Volumes for years 1910–1918, 1929, 1932–1939, 1944, published at Coimbra, 1917–1945. Title varies. tables. **DWB**—Periodical contains detailed monthly climatic data for Portugal's various colonies throughout the world, including Cape Verde Islands, Portuguese Guinea in the present region, as well as Angola, Timor, etc. (*See MAB* 3.4–49, April 1952 for abstract dealing with a later publication.) *Subject Headings:* **1. Climatic data 2. Cape Verde Islands 3. Portuguese Guinea.**

3H–171 551.586:612(675)

Schwetz, Jacques, **Le peuplement blanc au Congo: le point de vue médical.** [White settlement of the Congo: the medical point of view.] (In: Deux études sur le Congo Belge. Two studies of the Belgian Congo.] Pt. 2, Brussels. Université Libre, Institut de Sociologie Solvay, **1945.** p. 45–94). 10 refs. **NN**—Climatic and pathogenic obstacles to whites living in the tropics are included in a general, primarily medical, study of white settlement possibilities of the Congo. *Subject Headings:* **1. Medical climatology 2. Belgian Congo.**

3H–172 551.515:629.13

Smith, D. E., **Flying in cumulonimbus cloud in West Africa.** Great Britain. Meteorological Office, M.O.M. 477, **1945.** 3 p. plus 9 photos. **DWB**—Tropical cloud formation, cumulo-nimbus development and dangers are briefly noted. Personal experiences of pilots flying in cumulo-nimbus in West Africa are related, and a summary of advice and conclusions given. Cloud photos included. *Subject Headings.* **1. Aeronautical climatology 2. Thunderstorms 3. West Africa.**

3H–173 551.582(02)

†§U. S. Air Forces HDQ, **Tropical meteorology.** U. S. Army Air Forces Manual 105-0-2. Washington, D. C., **1945.** 268 p. numerous figs., 50 refs. Spanish translation available. **DWB**—A thorough resume is made of the theories, analytical aids and synoptic procedures, which have been demonstrated as useful and effective in the various tropical regions of the world, including those of Africa, Southeast Asia and Indonesia. Synoptic charts, vertical profiles, streamline charts and other analytical aids appear schematically with explanation of observational data. No data are tabulated, however. Contents include consideration of general atmospheric circulation in the tropics, tropical dynamic meteorology, analytical aids, waves in the easterlies, polar front in the tropics, zone of intertropical convergence and tropical cyclones. Good bibliography is appended. *Subject Headings:* **1. Tropical metèorology 2. Manuals 3. Tropical Africa 4. Southeast Asia 5. Indonesia 6. Tropics. I. AAF Manual 105-0-2.**

1946

3H–174 551.515(61)

†§Chancellor, Justus III, **West African weather patterns; study of outstanding meteorological conditions in tropical Africa.** Chicago, **1946.** 150 p. 71 figs., 6 tables, 17 refs. Typewritten. **DLC**—The outstanding synoptic weather types in central Africa are presented with special emphasis on West Africa where the most information was readily available. Chap. 1 takes up many aspects of the intertropical front: density discontinuity over Africa, temperature and moisture, frontal slope movement, surface location, January conditions. Chap. 2 analyzes the harmattan haze effect of topography on frontal systems over eastern Sahara, weather stations, synoptic analysis, sandstorms, characteristic harmattan haze outbreak, visibilities, haze at Gold Coast, Kano and Maiduguri, cold frontogenesis over eastern Sahara and general summary of outbreaks and dissipation of harmattan haze in central and west Africa. *Subject Headings:* **1. Synoptic studies 2. Harmattan 3. Sahara Desert 4. West Africa 5. Central Africa.**

3H–175 551.515:551.577(672)

de Backer, S. M., **Les pluies et les orages au Tchad.** [Rainfall and storms of Tchad.] *Belgium. Institut Royal Meteorologique, Miscellanées*, No. 24, **1946.** 19 p. 8 figs., 3 tables. **NN.** Also in: *Ciel et Terre*, 63(1–3):23–36, Jan.–March 1947. **DWB**—The climate of Chad in the dry and in the humid season is discussed, followed by notes, diagrams and brief tables of the rainfall, relative humidity, temperature, wind regime and clouds and particularly, an analysis of thundersquall conditions, causes, etc. *Subject Headings:* **1. Precipitation 2. Climatology 3. Thunderstorms 4. Chad, French Equatorial Africa.**

3H–176 551.582(664) 551.587(664)

*Great Britain. Meteorological Office, **Weather of the Sierra Leone Peninsula.** London, **1946.** 15 p. map, 14 figs., tables. M.O.M. 484. **DWB**—Paper is mainly a compilation of observations taken on peninsula since 1938, following inception of the British West African Meteorological Service. Included are: statistics of rainfall for many years prior to 1938 as well as information since 1938; temperature and humidity values and charts; vapor pressure; upper air temperatures and humidity; mixing ratios; surface winds, with monthly wind roses; upper winds over Freetown, Nov. 1939–April 1944, with monthly wind roses for 1500, 3000, 6000, 10,000 ft; notes and data on squalls and thunderstorms; base of low cloud; visibility; seasonal changes; monsoons, etc. Cloud photos included. *Subject Headings:* **1. Climatology 2. Upper air climatology 3. Sierra Leone.**

3H–177 551.582(665.7)

Marinho, Teixeira, **Esbõço do clima da Guine Portuguesa.** [Sketch of climate of Portuguese Guinea.] *Portugal. Junta das Missões Geograficas e de Investigações Coloniais, Anais*, 1:153–190, **1946.** map, tables. French and English summaries p. 186–190. **NNA**—Admittedly there are not sufficient data available for a complete study of Guinea climate, but this "partial study" considers observations, 1924–1943, made at Bolama. Each of the usual elements is discussed and some summary data included. Map shows annual isohyets for region. *Subject Headings:* **1. Climatology 2. Portuguese Guinea.**

3H–178 551.509.3:551.582(669)

Schove, Derek Justin, **A further contribution to the meteorology of Nigeria.** *Royal Meteorological Society, Quarterly Journal*, 72(311):105–110, **1946,** 3 figs. **Note on equatorial forecasting technique.** *Ibid.*, p. 110–112. **NNA**—Author, after various experiments, is confident that in the methods he presents lie important keys to tropical analysis. Notes on thermal maps, stability maps, normal and abnormal conditions, harmattan, line squalls and troughs in the easterlies, and fog are included. Figures show upper air conditions at Kano and Lagos, diagrams of formation of a squall and of the stability front. *Subject Headings:* **1. Forecasting techniques 2. Tropical climatology 3. Nigeria.**

1947

3H–179 551.582.2(665.7)

*Carvalho Guerra, Alfredo de, **Subsidios para o estudo do clima da Guiné Portuguesa.** [Contributions to the study of climate of Portuguese Guinea.] *Boletim Cultural da Guiné Portuguesa*, Bissau, 2(5):3–75, **1947.** graphs, charts, tables. **NNA**—Climatic conditions are thoroughly studied using observations for as many as 20 years from several stations. Work is well illustrated with charts, graphs, curves, wind roses and summary tables. Upper wind studies, 1940–1942, notes on "tornadoes" and other particular phenomena, etc. are included. *Subject Headings:* **1. Climatology 2. Portuguese Guinea.**

3H–180 551.515.4:551.551(669)

Dorrell, A. T., **Severe squall at Kano northern Nigeria.** *Meteorological Magazine*, London, 76:206–207, **1947.** 3 figs. **NNA**—Notes on development of the weather at Kano, June 12, 1947, culminating in a very severe squall. Autographic records of wind speed and direction and temperature and a sketch of the observed cloud are included. *Subject Headings:* **1. Thunderstorms 2. Squalls 3. Kano, Nigeria.**

3H–181 551.582(675) 551.509

Fraselle, E., **Introduction à l'étude de l'atmosphère congolaise; la prévision du temps à longue échéance en Afrique Equatoriale.** [Introduction to the study of the Congo atmosphere; long-range weather forecasting in Equatorial Africa.] *Belgium. Institut Royal Colonial Belge. Sections des Sciences Naturelles et Médicales, Mémoires*, Collection in 8°, 16(3), **1947.** 54 p. 18 refs. **NNA**—The work, in two parts, takes up first the principal dynamic features of Congo weather: the large aerial currents, trades, etc., their sources and specific climatic features; principal lines of discontinuity found in the Congo; discussion of fronts and the forecasting of their movements. The second section discusses long range forecasting as applied to equatorial Africa, considering solar influences, cycles of varying numbers of days and years, seasonal forecasting, the various problems of regional significance and the difficulties encountered. *Subject Headings:* **1. Dynamic climatology 2. Atmospheric circulation 3. Long range forecasting 4. Belgian Congo 5. Equatorial Africa.**

3H–182 551.582(675)

*Regnier, E., **Station météorologique de Costermansville.** [Costermansville meteorological station.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 38(2):351–376, June 1947. 3 figs., graphs, 8 tables. **NNA**—Founding and functions of the Costermansville station (1625 m, the mean altitude of the Rivu lake region) are briefly noted. Observations of the usual elements in the region, 1946, are summarized in some detail in the remaining bulk of the article. *Subject Headings:* **1. Meteorological stations 2. Climatology 3. Costermansville, Belgian Congo 4. Lake Kivu Region, Belgian Congo.**

3H–183 551.583.2:551.311.12

Robert, Maurice, **Les traces de glaciation et les périodes climatiques glaciaires au Katanga et en Afrique australe.** [Traces of glaciation and of glacial climate periods in Katanga and in South Africa.] Société Belge de Géologie, de Paléontologie et d'Hydrologie, Bulletin, 56(12):62–76, **1947.** refs. **DLC**—Geologic evidence of glaciation in these regions is discussed. *Subject Headings:* **1. Glacial periods 2. Katanga, Belgian Congo 3. South Africa.**

3H–184 551.524.2(675) 551.525(675)

†*Vandenplas, A., **La température au Congo belge.** [Temperature in the Belgian Congo.] Also: *Belgium. Institut Royal Météorologique, Mémoires*, v. 24, **1947.** 194 p. 14 figs., charts, 33 tables, 37 refs. **NNA**—Exhaustive survey made of the distribution and characteristics of temperature throughout the Belgian Congo, using data kept by the Central Meteorological Network, 1930–1939. Observational procedures are noted. Annual, seasonal and regional temperature distribution, taken up at length, and characteristics such as diurnal and annual variations, lack of sudden changes, low variability of temperature in general, and temperature frequencies. Soil temperature is treated separately, including air layers near the surface, the soil itself and temperatures at different depths. The work is well illustrated, contains a good bibliography and very complete collection of tabulated data. *Subject Headings:* **1. Temperature 2. Temperature data 3. Soil temperatures 4. Belgian Congo.**

1948

3H–185 551.501

Bernard, Étienne A., and Van der Elst, N. B. P., **L'organisation nouvelle du réseau et des recherches météorologiques au Congo belge.** [Recent organization of the network and meteorological research of the Belgian Congo.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 39(1):77–100, March **1948.** 6 figs., 2 maps (fold.) tables. **NNA**—Organization, methods, equipment, etc. of the stations of the meteorological network of the Belgian Congo are well summarized. Facts of geographical location, station order, etc. of numerous stations are tabulated, and locations shown on maps. *Subject Headings:* **1. Meteorological networks 2. Belgian Congo.**

3H–186 551.524.2 551.271.2(675)

*Bernard, Étienne A., **Premières données écoclimatiques sur la marche diurne de la température et de l'humidite de l'air à Yangambi (0°49′N, 24°29′E, 500 m.).** [First ecoclimatic contributions regards the diurnal regime of temperature and humidity at Yangambi.] *Belgium. Institut Royal*

Colonial Belge, Bulletin des Séances, 19:1:165–209, 1948. diagrs., 12 tables, 6 refs. **NNA**—Results of first year's temperature and humidity measurements at the central ecoclimatic station of the I.N.E.A.C. at Yangambi are reported along with descriptive comments and analysis in an attempt to add to knowledge of the equatorial continental climate type. *Subject Headings:* **1. Ecoclimatology 2. Temperature 3. Humidity 4. Yangambi, Belgian Congo.**

3H–187 551.577.2(675)

Regnier, E., **Le régime pluviométrique de la province de Costermansville.** [Rainfall regime of Costermansville province.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 39:4:875–891, Dec. 1948. 7 figs., tables. **NNA**—The rainfall regime of this province in the Kivu region is comprehensively summarized, and some representative data, annual isohyets, and means for numerous stations are appended. *Subject Headings:* **1. Precipitation 2. Costermansville Province, Belgian Congo.**

3H–188 551.521 551.576.2(675)

*Vandenplas, A., **La radiation, l'insolation et la nebulosité au Congo Belge.** [Radiation, insolation and nebulosity in the Belgian Congo.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 39:2:305–325, June 1948. 6 figs., 8 tables, 7 refs. **NNA**—The general importance of radiation to the climatic picture on the whole is stressed, and conditions of terrestrial radiation, insolation and nebulosity at stations in the several climatic regions of the Belgian Congo, observed for varying periods mostly 1928–1939 (but since 1894 for Banana and Kinwenza), are summarized in tables and discussed. *Subject Headings:* **1. Radiation 2. Terrestrial radiation 3. Insolation 4. Cloudiness 5. Belgian Congo.**

3H–189 551.577.2(675)

Vandenplas, A., **Sur la répartition verticale des précipitations dans la région montagneuse de l'Est du Congo belge.** [Vertical distribution of precipitation in the mountainous region of the eastern Belgian Congo.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 39:1:101–118, March 1948. fig., 6 tables, 8 refs. **NNA**—Using observational data, 1930–1939, from the network of stations in the mountainous region of the Congo-Nile divide, the author studies in some detail the distribution of precipitation as a function of altitude. Tables give monthly and annual rainfall normals and altitudes for various locations on the eastern and western slopes of the divide. Other aspects such extent of forest, degree of moisture content of the air, etc. are considered as well. *Subject Headings:* **1. Precipitation distribution 2. Climatology 3. Congo-Nile Divide (Kivu) Region, Belgian Congo.**

1949

3H–190 551.586:58

†Aubréville, André, **Climats, forêts et désertification de l'Afrique tropicale.** [Climates, forests and desertification of tropical Africa.] *Paris, Société d'Éditions Géographiques Maritimes et Coloniales*, 1949. 351 p. 34 cm. figs., maps, folding plates, table, refs. p. 345–351. **NN**—A major contribution to the study of the forests of tropical Africa including their climatic distribution on the continent east to west from about 12°N to 30°S, written from long experience and personal observation. A definition of the ecologic forest climate is given; practical use of comparative forest bioclimatology noted; the tropical regions are outlined and characteristics of their flora noted; fundamentals of classification of the tropical forest bioclimates, their various climatic elements and classification, vegetative aspects, etc. are treated at length. Causes for the climates of the several large natural regions of tropical Africa are discussed; climate and forest types are mapped. Desiccation in Africa, its causes and cures, is taken up at some length. The work is liberally illustrated with maps, climagrams, etc., and a long climatologic and phytogeographic bibliography is included. (*See MAB* 3:2:170, Feb. 1951.) *Subject Headings:* **1. Climatology 2. Bioclimatology 3. Forests 4. Tropical Africa.**

3H–191 551.515.8(661)

Chase, Joseph, **Some general aspects of the intertropical front (ITF) as observed over West Africa.** *Portugal. Serviço Meteorológico Nacional, Memorias*, 1, No. 3, Feb. 12, 1949. 3 p. **DWB**—ITF described as not a true front but a zone of convergence over Atlantic and a dividing line between two air masses over Africa. Conditions north and south of the ITF and the winds aloft in the vicinity are described briefly. Various climatic regions, climatic types, etc., taken up. *Subject Headings:* **1. Fronts 2. Air masses 3. Upper air winds 4. West Africa.**

3H–192 551.582(661)(02)

†*Great Britain. Meteorological Office. **Weather on the west coast of tropical Africa, from 20°N to 20°S including the Atlantic Ocean to 25°W.** London, 1949. 281 p. map, 71 figs., 14

tables, 139 refs. M.O. 492. **NNA**—Handbook, prepared for meteorological officers of ships, summarizes available statistical and descriptive material on weather of West African coast. General description of climate given as well as details of local variations. The first part of the volume deals with the general climatic features and the more detailed regional summaries. The remainder of the text deals with each of the meteorological elements in turn, giving mean and extreme values. Local notes and notes on forecasting are also included as well as a bibliography, divided by region and by particular meteorological element. *Subject Headings:* **1. Climatology 2. Handbooks 3. West African Coast 4. Cape Verde Islands 5. French West Africa.**

3H–193 551.55:551.582:629.13(661)

Leluin, P., **Le temps à Port-Étienne.** [The weather at Port-Étienne.] *La Météorologie*, 4th Ser., No. 15:147–156, July–Sept. **1949.** fig., 7 tables. French and English summaries. **MH-BH**—The weather at Port-Étienne (21°N) is seldom controlled by either extratropical or intertropical frontal disturbances, but mostly by prevailing winds. Rainfall, cloudiness, visibility and surface winds are analyzed in connection with the seasonal air flow regime, and forecasting is discussed on the basis of the location of the Intertropical Front. *Subject Headings:* **1. Aeronautical climatology 2. Trade winds 3. Tropical fronts 4. Climatology 5. Port-Étienne, French West Africa.**—*M.R.*

3H–194 551.582.2(669)

*Nigeria. Survey Dept., **Meteorological return, Nigeria, for the month of. . . .** *Nigeria Gazette*, Jan. 1936–[1949]. tables. **NN**—Beginning with summaries of meteorological observations for each month for some 30 stations of Nigeria are published monthly in this periodical and indexed. *Subject Headings:* **1. Climatic data 2. Nigeria.**

3H–195 551.577.21(669)

Nigeria. Survey Dept., **Map of Nigeria; mean annual rainfall in inches.** Lagos, **1949.** single sheet. **NNA**—Rainfall map shows annual distribution of rainfall in the country. *Subject Headings:* **1. Rainfall charts 2. Nigeria.**

1950

3H–196 551.577.2(675)

*Bultot, F., **Régimes normaux et cartes des précipitations dans l'Est du Congo belge.** [Normal regimes and charts of precipitation in eastern Belgian Congo.] *Institut National pour l'Étude Agronomique du Congo Belge. Bureau Climatologique, Communication* No. 1. **1950.** 49 p. 13 charts (fold.), 11 tables, 13 refs. **NNA**—This work marks the beginning of a new series by the I.N.E.A.C. The region considered lies on the eastern boundary of the Congo. Observational set-up is described. Monthly and annual precipitation values are tabulated for the different stations for periods between 1930–1946, and monthly rainfall charts are constructed. Relations between relief, air currents and precipitation are considered, and monthly and annual distribution are discussed. Review in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 2:5):511, 1951. (See also *MAB* 2.7-137, July 1951.) *Subject Headings:* **1. Precipitation 2. Belgian Congo.**

3H–197 551.582.3(675)

Bultot, F., **Carte des régions climatiques du Congo belge établie d'après les critères de Köppen.** [Chart of climatic regions of the Belgian Congo established from Köppen's criteria.] *Institut National pour l'Étude Agronomique du Congo Belge. Bureau Climatologique, Communication* No. 2. **1950.** 13 p. map (fold.), 9 refs. **NNA**—A map is constructed using information from 600 rainfall stations, 110 for period 1930–1946; and 490 for 1940–1946, based on Köppen's system of climatic classification. The method is explained; relations of climate with vegetation and relief, pointed out. (See also *MAB* 2.8-139, Aug. 1951.) *Subject Headings:* **1. Climatic charts 2. Climatic classification 3. Belgian Congo.**

3H–198 551.577.3

Fraselle, E., **Le cycle de pluviosité de 27 (27,0074) jours; les derniers résultats.** [The rain cycle of 27 (27.0074) days; final results.] *Belgium. Institut Royal Colonial Belge, Bulletin des Séances*, 21(1):245–247, **1950.** tables, 2 refs. **DWB**—Author finds a cycle of 27 days in rainfall of Shangugu (Lake Kivu) 1946–1949. *Subject Headings:* **1. Rainfall cycles 2. Lake Kivu Region, Belgian Congo.**

3H–199 551.583.13(675)

Fraselle, E., **Le problème des cycles en climatologie congolaise.** [The problem of cycles in Congo climatology.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 41(2):411–426, June **1950.** 4 figs., tables, 10 refs. **NNA**—In the first part the author uses data for a period 1946–1949 in a theoretical study of periodicities in precipitation. He discusses the

influence of the 27-day cycle on the precipitation of central Africa. In the second part he takes up the problem of hydrographic and climatologic cycles in the Kagera Basin, Victoria Nyanza, using data 1906–1914. *Subject Headings:* 1. Climatology 2. Cycles 3. Hydrography 4. Rainfall periodicities 5. Belgian Congo 6. Ruanda-Urundi.

3H–200 551.557.31'664,

Hogg, W. H. Diurnal variation of upper wind at Freetown. *Meteorological Magazine*. London. 79:149–157. May 1950. 2 figs., 2 tables. DWB—From pilot balloon observations at Freetown, Sierra Leone, mean vector changes of wind 0h, 11h., 11h., 16h., 16h.–6h., are shown for surface, 1000, 2000, and 4000 ft. for four seasons. Sea breeze effect is determined by general run of coast, but considerable normal to this are considered. During most of year wind is off sea up to 3000 ft. and on land at 4000 ft., a transfer off land is evident between 6h. and 11h., off sea between 11h. and 16h. (Same as *M.A.B.* 9:70. June 1950.) *Subject Headings:* 1. Upper air winds 2. Wind variations 3. Freetown, Sierra Leone.

3H–201 551.577.2(669)

Perkins, W. A. **The rainfall of Ibadan.** *Farm and Forest*. 10:26–32. 1950. 5 figs., 5 refs. **NNA**—Mean monthly rainfall records for Ibadan, 1911–1948, are collected and summarized. Annual rainfall means, rainfall histogram, rainfall frequency curve, and chart of 30-year variations are included. *Subject Headings:* 1. Precipitation 2. Ibadan, Nigeria.

3H–202 551.586:612

Vandenplas, A. **Influence de la température et de l'humidité de l'air sur les possibilités adaptation de la race blanche au Congo Belge.** [Influence of temperature and humidity on possibilities of white adaptation to the Belgian Congo.] *Belgium. Institut Royal Colonial Belge. Section des Sciences Naturelles et Médicales. Mémoires. Collection in 8°.* 19(1), 1950. 60 p., 16 figs., 47 refs. **NNA**—Author examines the climatic possibilities, especially those of temperature and humidity, of permanently engineering a large number of Europeans in the Belgian Congo. Climatic effects on the human organism in general are discussed with examples using Congo conditions. The second part deals with the establishment of engineering values in the different natural regions of the Congo. It is concluded that temperature and humidity conditions of the Congo-Nile divide region and of Katanga above 1,200 m. are satisfactory for white settlement. However, it is pointed out that other climatic factors not yet thoroughly investigated, must also be considered, such as solar radiation, atmospheric electricity, air mass conditions etc., as well as economic and social conditions. Some data are tabulated summarily, but most appear in diagram form. References are partly on medical climatology in general and partly on Belgian Congo. *Subject Headings:* 1. Medical climatology 2. Human activity 3. Sultriness 4. Belgian Congo.

3H–203 551.509

Vuorela, Lauri A. **Synoptic aspects of tropical regions of the Atlantic Ocean, West Africa and South America. *Helsinki. University. Meteorological Institute. Mitteilungen. No. 67.* 1950. 130 p., 47 figs., 44 charts, 14 tables, 12 refs., 10 appends. DWB—A thorough synoptic aerological study of conditions over the Atlantic, especially the tropical part, during a voyage from northwest Europe to Buenos Aires and back in the fall of 1949. The expedition was led by Vaisala and was supported by many institutions. Besides other surface and aerological observations, 112 radiosondes (Finnish make) released and evaluated. Many excellent charts, cross sections and flow patterns over the tropical Atlantic as well as synoptic conditions over South America are given. (Same as *M.A.B.* 9:4–37. April 1951.) *Subject Headings:* 1. Tropical meteorology 2. Synoptic analysis 3. Aerological studies 4. Atlantic Ocean 5. West Africa 6. South America.—*M.R.*

1951

3H–204 551.5(05)(675)

*Belgian Congo. Service Météorologique. **Bulletin, No. 1–.** Jan. 1951–. tables. In French, French, Dutch, English and German parameters. Mimeographed. DWB—Mimeographed series published by members of the Belgian Congo Meteorological Service staff. On inside covers the synoptic stations in the Congo network (74) and in Ruanda-Urundi (5) are listed and the coordinates, elevation, type of station, etc. are given. Each number contains two sections: one with a few articles by staff members, and one with fairly elaborate summaries of observational data obtained during that month from the network of stations in the Congo, complete with stations and upper wind roses, histograms for sunshine, precipitation, temperature and relative humidity. On inside covers the synoptic stations in the network of the Belgian Congo (74) and in Ruanda-Urundi (5) are listed and the coordinates, elevation, type of station, code number, etc. are given. *Subject Headings:* 1. Climatic data 2. Synoptic networks 3. Belgian Congo 4. Ruanda-Urundi.—*M.R.*

3H–205 551.54

Bourguignon, R. (*Dir. Statistical Bureau, Belgian Colonial Met. Serv.*), **Diagrammes de pression au Congo Belge pour 20 stations.** [Diagrams of pressure in the Belgian Congo taken at twenty stations.] *Belgium. Institut Royal Colonial Belge, Mémoires*, 6(4), **1951.** 188 p. all graphs and tables. Price: Fr. 350. **DWB**—Monthly mean pressure curves and values of absolute maximum and minimum pressure are presented for 15 stations with reliable barometers, barographs and observers. Mean values and absolute maxima and minima of pressure are tabulated for stations with good barometers but unsatisfactory barographs. The data represent measurements made at 20 stations during the period 1946–1949. Geographic location and altitude of the stations is indicated and the method used in computing the data explained. *Subject Headings:* **1. Pressure data 2. Belgian Congo.**—*G.T.*

3H–206 551.571:58

*Garnier, P., **Le déficit de saturation absolu en A.O.F.** [Absolute deficit of saturation in French West Africa.] *Institut Français d'Afrique Noire, Dakar Bulletin*, 13(3):733–748, July **1951.** 4 figs., table, refs., equations. **DLC**—Chart shows mean annual saturation deficit in French West Africa, based on data for 39 stations (indicated on separate chart). Formula used is given and examples of computation of absolute saturation deficit cited. Relation of vegetation in West Africa to saturation deficit lines is discussed. Monthly mean data are tabulated for the 39 stations arranged latitudinally. Seasonal variations are shown in 18 graphs. *Subject Headings:* **1. Saturation deficit 2. Plant ecology 3. French West Africa.**—*M.R.*

3H–207 551.510

Grosjean, P. V., **L'atmosphère équatoriale moyenne au-dessus de Leopoldville.** [Mean equatorial atmosphere above Leopoldville.] *Belgian Congo. Service Météorologique. Bulletin*, No. 2:1–25, Feb. **1951.** diagrs., tables, equations. Summaries in French, Dutch, English and German. **DWB**—Two series of radio soundings have been made in Leopoldville during different seasons. Mean curves of real and virtual temperatures have been drawn, and the quadratic standard deviations of these variables have been established. Two different ways of mathematical adjustment of these curves have been followed. . . . The altimetric graph obtained is different from official standard atmosphere. *Subject Headings:* **1. Equatorial meteorology 2. Altimetry 3. Belgian Congo.**—*Author's abstract.*

3H–208 551.582(6)

*O'Donohue, B. V. (*comp.*), **The transition belt between tropical savanna and low-latitude steppe in North Africa.** *Western Australia. University. Geographical Laboratory, Research Report* No. 26, June **1951.** 16 p. tables, map, refs. **MH-BH**—Geographical and climatic aspects of a belt extending across Africa between 13° and 16°N are described and their effect on vegetation, animal life and human living discussed in an elementary fashion. Temperature, pressure and precipitation characteristics are summed up. Monthly mean precipitation data presented from >60 stations in Mauritania, Senegal, French Sudan, Niger Territory, Chad Colony, Nigeria and Anglo-Egyptian Sudan, and precipitation effectiveness for 21 stations in the same area are based on records of varying length, the longest being for 34 years. (Same as *MAB* 3,7–175, July 1952.) *Subject Headings:* **1. Climatic data 2. Precipitation effectiveness 3. Central Africa.**—*G.T.*

SUPPLEMENTARY MATERIAL

3H–209 551.5:629.13

Pan American World Airways, Inc. Communications Dept. Meteorological Section, **African and Arabian weather.** [New York?] Pan American Airways, Inc., **1944.** 35 p. figs. (part fold.), charts, tables. Typescript. **DLC**—Pt. I (p. 1–14) is a description of "weather conditions encountered by aircraft and at ground stations along the western portion of the Trans-African Ferry Route during the period January to September 1942." General circulation of the area is considered first. Then the general weather situation is described for the three seasons: wet (April–June), transitional (Nov. March) and dry (July–Aug.). Characteristics are given in tabular form for each season for three areas: 1) North—which includes Kano, Maiduguri and Fort Lamy, 2) South—which includes Accra, Takoradi and Lagos and 3) West—which includes Roberts Field, Fish Lake and Freetown. Recognizes four types of weather which have a direct bearing on airline operations: line squalls and monsoon conditions during the wet season, thunderstorms during the transitional season and harmattans during the dry season. Important features of each of these types are shown in a table. *Subject Headings:* **1. Weather conditions 2. Aeronautical climatology 3. West Africa.**—*M.L.R.*

3H–210 551.5(08)(675)

*Belgian Congo. Service Météorologique. **Bulletin**, No. 1, Jan. 1951. tables. In French; French, Dutch, English and German summaries. **DWB**—The first of a hectographed journal series published by members of the staff of the Belgian Congo Meteorological Service. It contains two sections, one with a few articles by staff members and one with fairly elaborate summaries of observational data obtained during that month from the network of stations in the vast area of the Belgian Congo (complete with surface and upper air wind roses, histograms for sunshine, precipitation, temperature and relative humidity). On inside covers the synoptic stations in the network of the Belgian Congo (74) and in Ruanda-Urundi (3) are listed and the coordinates, elevation, type of station and code number are given. *Subject Headings:* **1. Periodicals 2. Monthly climatic reports 3. Synoptic networks 4. Belgian Congo 5. Ruanda-Urundi.**—*M.R.*

3H–111 551.582(671.8)

*Font, Tullot, Inocencio. **El clima de las posesiones españolas del Golfo de Guinea.** [The climate of the Spanish possessions of the Gulf of Guinea.] Consejo Superior de Investigaciones Científicas, Instituto de Estudios Africanos, Madrid, 1951. 71 p. figs., tables. **DAWS**—Detailed and well-rounded climatology based on data acquired to 1949 and incorporating information given in "Climatología de los territorios españoles del Golfo de Guinea," by Jaime Nosti (1942). Monthly mean temperature, pressure, wind speed, humidity, insolation, occurrences of severe squalls, direction wind roses, and extreme temperatures and wind speeds are given for Santa Isabel (Fernando Poo), as well as mean pressures and temperatures for Duala and Campo (Cameroons). For 14 stations in the islands and on the mainland, monthly mean and 24-hour maximum rainfall amounts are given, along with annual isohyetal maps of Fernando Poo and Spanish Guinea. The regimes of local winds, variations in the position of the inter-tropical convergence zone, and the distribution of special phenomena are described. A chapter on applied climatology considers applications in agriculture, and physiological effects of the climate on the white man, and includes useful information for pilots. *Subject Headings:* **1. Climatology 2. Applied climatology 3. Climatic data 4. Fernando Poo 5. Guinea Coast Region. I. Nosti, Jaime.**—*R.S.Q.*

3H–212 551.586:631.6 551.582.1(669)

Grove, A. T., **Soil erosion and population problems in south-east Nigeria.** *Geographical Journal*, London, 117(3):291–306, Sept. 1951. diagrs., graphs, refs. **DWB**—The brief climatic description of southeast Nigeria contains graphs of average monthly rainfall, mean monthly relative humidity and a map of isohyets. *Subject Headings:* **1. Soil erosion 2. Climate of Nigeria 3. Climatic data 4. Nigeria.**—*I.L.D.*

3H–213 551.506.1(667)

*Gold Coast. [Meteorological Service]. **Monthly weather report.** Jan. 1949 June 1952. 4 p. each. mostly tables. Mimeographed. At head of first page: British West African Meteorological Services. **DWB**—Text, entitled "Notes on the month's weather," contains a brief resume of the general situation and notes on line squalls, pressure, temperature, relative humidity, rainfall and harmattan haze. Tables summarize usual meteorological data (including days with various hydrometeors) for 32 stations and a more detailed summary of rainfall data for 55 rain gage stations. Geographic coordinates and altitude shown for all stations. *Subject Headings:* **1. Monthly climatic reports 2. Climatic data 3. Gold Coast.**—*M.L.R.*

3H–214 551.506(058)(664) 551.582(058)(644)

*Sierra Leone. Meteorological Service. **Annual summary of observations, 1950. 1951.** 23 p. all tables. **DWB**—A climatological summary with monthly means is given for 23 stations in Sierra Leone, daily values are presented for the Lungi station near Freetown. A summary of rainfall observations for 44 stations includes also normal rainfall values for long periods. *Subject Headings:* **1. Observational data 2. Climatic data 3. Annual reports 4. Sierra Leone.**—*A.A.*

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only, and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of date of publication, the pagination may be omitted.

Akademiia Nauk SSSR, Izvestiia, Seriia Geofizicheskaia, Number 3, 1952.

Bezverkhnii, Sh. A., Osherovich, A. L. and Rodionov, S. F.: **Elektrofotometricheskie issledovaniia prozrachnosti atmosfery v ul'trafioletovoĭ oblasti spektra,** [Electrophotometric investigation of atmospheric transparency in the ultraviolet portion of the spectrum], p. 93–102.

American Meteorological Society, Bulletin, Volume 33, Number 5, May 1952.

Remarks by Dr. Alan T. Waterman, Director of the National Science Foundation, before the American Meteorological Society, New York, N. Y., January 30, 1952, p. 183–187.

Sartor, J. D., Katz, I. and Katz, R. E.: **A mobile method for measuring atmospheric diffusion,** p. 188–194.

Thompson, J. C.: **Applied research in weather forecasting,** p. 195–198.

George, Joseph Johnson: **Objective forecasting studies,** p. 199–201.

Gringorten, Irving I.: **An objective aid to local forecasting,** p. 202–207.

Brier, Glenn W. and Enger, Isadore: **An analysis of the results of the 1951 cloud seeding operations in Central Arizona,** p. 208–210.

Byers, Horace R.: **An example of a flight through a thunderstorm updraft,** p. 211–212.

Annales de Géophysique, Volume 80, Number 1, January/March 1952.

Robley, R.: **La diffusion multiple dans l'atmosphère déduite des observations crépusculaires,** [Multiple diffusion in the atmosphere deduced from twilight observations], p. 1–20.

Dessens, Henri, Lafargue, C. and Stahl, P.: **Nouvelles recherches sur les noyaux de condensation,** [New research on condensation nuclei], p. 21–32.

Cochet, Robert: **Évolution d'une gouttelette d'eau chargée dans un nuage a température positive,** [Evolution of a charged water droplet in a cloud with positive temperature], p. 33–54.

Denisse, Jean-François: **Relation entre l'activité géomagnétique et l'activité radioélectrique solaire,** [Relation between geomagnetic activity and radioelectric solar activity], p. 55–64.

Lenoble, Jacqueline: **Mesures préliminaires par enregistrement spectrographique de l'ultraviolet solaire a Paris,** [Preliminary measurements of the solar ultraviolet at Paris by means of a spectrographic method], p. 65–75.

Vegard, L.: **Recent advances in auroral spectroscopy and in our knowledge of the upper atmosphere,** p. 91–99.

Beaufils, Y.: **Répartition spectrale des variations rapides dans les courants telluriques,** [Spectral distribution of rapid variations in telluric currents], p. 100–104.

Le Grand, Yves: **A propos de la pénétration de la lumiere dans la mer,** [On penetration of light into the sea], p. 105.

Jobert, G.: **Marées terrestres d'un globe fluide hétérogene,** [Terrestrial tides on a heterogeneous fluid globe], p. 106–111.

Annales de Géophysique, Volume 80, Number 2, April/June 1952.

Nicolet, M.: **Actions du rayonnement solaire dans la haute atmosphère,** [Action of solar radiation in the upper atmosphere], p. 141–193.

Bates, D. R.: **Some reactions occurring in the earth's upper atmosphere,** p. 194–204.

Chapman, Sydney: **Theories of the aurora polaris,** p. 205–225.

Gauzit, J.: **Relations entre la température et les phénomènes de dissociation ou d'ionisation photochimique dans la haute atmosphère. Examen particulier de la région E,** [Relation between temperature and photochemical dissociation or ionization in the upper atmosphere with special consideration of the E layer], p. 226–231.

Barbier, Daniel and Pettit, Helen: **Photometric observations of the airglow and of the aurora borealis at College, Alaska,** p. 232–247.

Bernard, Pierre: **Isolement de la variation undécennale de la composante horizontale du champ magnétique terrestre par combinaisons linéaires d'ordonnées,** [Isolation of the undecennal variation of the horizontal components of the terrestrial magnetic field by linear combinations of ordinates], p. 248–252.

Israël, Hans: **Die Höhe der luftelektrischen Ausgleichsschicht,** [Height of the atmospheric electricity equilibrium layer], p. 253–257

Gibault, G.: **Variations rapides du champ magnétique terrestre,** [Fast variations of the terrestrial magnetic field], p. 258–259.

Berbezier, J., Chaminade, R. and Lallemant, C.: **Description de l'équipment d'un véhicule de radiosondage gamma,** [Description of the equipment for a gamma radiosonde vehicle,] p. 260–263.

Geofisica Pura e Applicata, Volume 22, Number 3/4, April/June 1952.

Heiskanen, W.: **On the geodetic control systems,** p. 133–138.

Berroth, A.: **Der künstliche Mond als Hilfsmittel für Geodäsie und Astronomie,** [The artificial moon as an aid to geodesy and astronomy], p. 139–146.

Berroth, A.: **Stand und Entwicklungsmöglichkeiten der absoluten Schwerenmessungen,** [Status and possibilities for progress in absolute gravity measurement], p. 147–161.

Bernasconi, Carlo: **Questioni di ottica geometrica risolte con metodi meccanici,** [Problems of geometric optics resolved by mechanical methods], p. 162–165.

Werner, P. Wilh.: **Vibration of finite water bodies with free surface,** p. 166–170.

Arakawa, H.: **Phugoid motion of whirlwinds in the atmosphere,** p. 171–173.

James, R. W.: **Heat diffusion from a plane, periodic source,** p. 174–188.

Mühleisen, R. and Holl, W.: **Eine neue Methode zur Messung der elektrischen Raumladungsdichte der Luft,** [A new method of measuring the electrical space charge of air], p. 189–194.

Vittozzi, Pio: **Coefficiente di diffusione per un granulo di polvere vulcanica, nel caso di energia incidente su di esso secondo tutte le direzioni,** [Coefficients of diffusion for a particle of volcanic dust in the case of incident energy coming from all directions], p. 195–204.

Wegener, Kurt: **Die Sonnestrahlung und ihre Messung,** [Solar radiation and its measurement], p. 205–236.

Fritsch, Volker: **Geoelektrische Untersuchungen zur Ermittlung der Blitzgefährdung,** [Geoelectric investigations for the determination of lightning danger], p. 237–250.

Sanuki, M.: **Oscillation of wind vane in a wind fluctuating both in direction and speed],** p. 251–254.

Bossolasco, Mario: **Sullo spostamento dei cicloni nel Mediterraneo,** [The weakening of cyclones in the Mediterranean], p. 255–261.

Geografiska Annaler, Volume 33, Number 3–4, 1951.

Thorarinsson, Sigurdur: **Notes on patterned ground in Iceland, with particular reference to the Icelandic "Flás,"** p. 144–156.

Orvig, Svenn: **The climate of the ablation period on the Barnes Ice-Cap in 1950,** p. 166–209.

Krames, Karl: **Die Korrelation zwischen Temperatur-und Niederschlagsanomalien im Winter der Nordhemisphäre,** [The correlation between temperature and precipitation anomalies during the winter of the Northern Hemisphere], p. 210–229.

Wallén, C. C.: **Leo Lysgaard: Recent climatic fluctuations,** p. 230–232.

Germany. Deutscher Wetterdienst in der US-Zone. Berichte, Number 35, 1952.

Hellpach, W.: **Meteorologie und Leben,** [Meteorology and life], p. 7–11.

Flohn, Hermann: **Probleme der grossräumigen Synoptik,** [Problems of large scale synoptics], p. 12–23.

van Mieghem, Jacques: **Seasonal fluctuations of the earth's rotation and the general circulation of the atmosphere,** p. 24–26.

Cappel, A.: **Isoplethendarstellung des Luftdrucks als Hilfsmittel für die Diagnose räumlicher und zeitlicher Witterunsgzusammenhänge,** [Isopleth representation of pressure as an aid in diagnosis of spatial and temporal weather relations], p. 26–33.

Müller-Annen, Hans: **Andauerkarten der Luftdruckänderungen als Hilfsmittel bei der Mittelfristvorhersage,** [Duration charts of pressure changes as an aid in medium range forecasting], p. 33–36.

Walden, Hans: **Verhalten stationärer Hochdruckgebiete bei Annäherung einer wandernden Hochzelle,** [Behavior of stationary high pressure areas on the approach of a moving anticyclone], p. 36–42.

Hess, Paul: **Der Katalog der Grosswetterlagen Europas: Einführung und erste Zirkulationsuntersuchungen,** [The catalog of the broad-weather situations of Europe: introduction and first circulation investigations], p. 42–48.

Brezowsky, Helmuth: **Säkulare Schwankungen der Zirkulation,** [Secular variations of the circulation], p. 48–56.

Mildner, Paul: **Über Langfristprognosen,** [On long-range forecasts], p. 56–62.

Maletzke, R.: **Die Mittelfristvorhersage der Vb-Zyklone, eine grossraumsynoptische Aufgabe,** [Medium range forecasting of Vb cyclones, a large-scale synoptic problem], p. 62–67.

Seilkopf, Heinrich: **Modelle der atmosphärischen Grosszirkulation,** [Models of the large scale atmospheric circulation], p. 68–71.

Gasser, O.: **Die Vorhersage der Wasserspiegelhöchststände und der stärksten Anstiege vom Bodensee,** [Forecasting the highest water levels and the most rapid rises of Lake Constance], p. 71–75.

Lossnitzer, H.: **Die Bedeutung der Strahlungsmessmethoden für die Dynamik der Atmosphäre,** [The importance of methods of measuring radiation for the dynamics of the atmosphere], p. 76–79.

Koschmieder, Harald: **Zur Theorie der Hurricanes,** [On the theory of hurricanes], p. 79–85.

Zierep, J.: **Leewellen bei geschichteter Anströmung,** [Lee waves in a stratified current], p. 85–90.

Faust, Heinrich: **Zur Dynamik der Hoch- und Tiefdruckgebiete,** [On the dynamics of high and low pressure areas], p. 92–99.

Doporto, M.: **Vertical motion and divergence computed from upper air variations of pressure and temperature at Valentia,** p. 103–113.

Holzapfel, Rupert: **Grossräumige Störungen im normalen Jahresverlauf oberhalb der Tropopause,** [Large scale disturbances in the normal annual variation above the tropopause], p. 113–116.

Berg, Hellmut: **Der Föhn im nördlichen Alpen- und Voralpengebiet vom 11. bis 14. März 1951,** [Föhn in northern Alpine and Fore-Alpine region March 11–14, 1951], p. 117–124.

Weber, Siegfried: **Studie über Vertikalgeschwindigkeiten in der hohen Troposphäre innerhalb starker Windfelder,** [Studies on vertical velocities in the high troposphere inside strong wind fields], p. 124–132.

Frankenberger, Ernst: **Grundlagen zur Messungen von Strömen des atmosphärischen Vertikalaustausches,** [Bases for measuring currents in atmospheric vertical exchange], p. 133–135.

Möller, Fritz: **Die Aufrechterhaltung der Westdrift durch Grossaustausch,** [Maintenance of west drift by large scale exchange], p. 135–138.

Rossmann, Fritz: **Physikalische Probleme des wiederbeginnenden Deutschen Segelfluges,** [Physical problems of the recommencing German gliding], p. 138–143.

Meurers, Joseph: **Zur Aerodynamik der Pilotballone,** [On the aerodynamics of pilot balloons], p. 143–149.

Hinzpeter, Max: **Zur Aerodynamik des Radiosondeaufstieges,** [On the aerodynamics of radiosonde ascents], p. 150–154.

Reichel, Eberhard: **Der Stand des Verdunstungsproblems,** [The position of the evaporation problem], p. 155–172.

Möller, Fritz: **Zur Bestimmung der Gebietsverdunstung aus der Advektion,** [Determination of regional evaporation from advection], p. 172–173.

Steinhäuser, Hans: **Über die Gebietsverdunstung in den österreichischen Südalpen,** [On the regional evaporation in the Austrian southern Alps], p. 174–179.

Schulze, Alfred: **Das Verdunstungsproblem im Rahmen der Klimaklassifikation,** [The evaporation problem in the sphere of climate classification], p. 179–182.

Uhlig, Siegfried: **Die Abschätzung der Bodenverdunstung an Hand von Bodenfeuchtenmesswerten,** [Determination of soil evaporation by soil moisture measurements], p. 182–189.

Schubach, Karl: **Verdunstungs- und Wasserhaushaltsuntersuchungen an verschiedenen Böden,** [Evaporation and water economy investigations in different soils], p. 189–193.

Boss, G.: **Die Brauchbarkeit des Piche-Evaporimeters bei Verdunstungsmessungen,** [The suitability of the Piche evaporimeter for evaporation measurements], p. 194–202.

Leistner, Walter: **Ergebnisse vergleichender Verdunstungsbeobachtungen,** [Results of comparative evaporation observations], p. 202–210.

Baumbach, S.: **Vergleichsmessungen mit verschiedenen Verdunstungsmessern unter definierten Versuchsbedingungen,** [Comparative measurements with different evaporimeters under defined conditions], p. 211–216.

Israël, Hans: **Luftelektrizität und Meteorologie,** [Atmospheric electricity and meteorology], p. 217–223.

Dieminger, W.: **Bewegungsvorgänge in der Ionosphäre,** [Movement processes in the ionosphere], p. 224–227.

Abild, Bruno: **Überreichweiten bei ultrakurzen Wellen und ihre meteorologischen Ursachen,** [Abnormal ranges of ultrashort waves and their meteorological causes], p. 227–228.

Baumbach, S.: **Die Erklärung der roten und der blauen Sonne,** [The explanation of red and blue sun], p. 228–232.

Hellpach, W.: **Variolabile und Statotoniker,** [Variolabile and statonic subjects], p. 233–235.

Reiter, R.: **Bio-meteorologische Indikatoren von grossräumiger und prognostischer Bedeutung,** [Bio-meteorological indicators of large scale and prognostic importance], p. 235–253.

Effenberger, Ernst: **Das Staubproblem in der Meteorologie und in der Hygiene,** [The dust problem in meteorology and hygiene], p. 253–257.

Volz, F.: **Über die Zerstörung des Ozons in der Troposphäre,** [On the destruction of ozone in the troposphere], p. 257–261.

Junge, Chr.: **Gesetzmässigkeiten in der Grössenverteilung atmosphärischer Aerosole über dem Kontinent,** [Regularities in the large scale distribution of atmospheric aerosols over the continent], p. 261–277.

Schulze, Rudolf: **Einige vorläufige Ergebnisse von Messungen der Sonnen- und Himmelsstrahlungen auf geneigte Flächen,** [Preliminary results of measurements of sun and sky radiation on inclined surfaces], p. 277–284.

Dammann, Walter: **Grundlagen für eine Klimaeinteilung der Nordhalbkugel nach dem Witterungsverlauf,** [Bases for a climatic classification of the Northern Hemisphere according to the course of weather], p. 284–293.

Grunow, Johannes: **Beiträge zum Hangklima,** [Contributions to slope climate], p. 293–298.

Höhndorf, Fritz: **Anomalien im nächtlichen Temperatur-Gang auf dem Hohenpeissenberg,** [Anomalies in the nocturnal course of temperature on the Hohenpeissenberg], p. 299–301.

Werner, J.: **Über die Bestimmung des Wassergehalts der Atmosphäre aus den Wasserdampfbanden des Sonnenspektrums mittels Jenaer Interferenzfilter,** [On the determination of the water content of the atmosphere from the water vapor bands in the solar spectrum by the Jena interference filter], p. 302–303.

Lehman, Paul: **Ein Integrator für Wärmeumsatzmessungen im Boden,** [An integrator for measurements of heat exchange in the ground], p. 304–306.

Gelbke, W.: **Untersuchungen zur Entwicklung elektrischer Tauregistrierverfahren,** [Investigations for the development of electrical dew-recording procedures], p. 306–311.

Kopp, Walter: **Auswertung von Tropfenschreiberregistrierungen und Vergleich der Registrierungen benachbarter Stationen,** [Evaluation of raindrop recordings, and comparison of records of neighboring stations], p. 312–316.

Malsch, Wolfgang: **Vergleich von Niederschlagsmessungen mit einem freistehenden und einem in die Erde versenkten Regenmesser,** [Comparison of rainfall measurements with a free rain gage and one sunk in the ground], p. 316–320.

Werner, J.: **Radiosondehöhen und temperaturbedingte Druckdosenkorrektionen im Spiegel gleichzeitiger Radarmessungen,** [Radiosonde heights and temperature corrections to the pressure element in the light of simultaneous radar measurements], p. 320–322.

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Schlegel, Max: **Alte meteorologische Karten und Welt-Atlanten,** [Old meteorological charts and world atlases], p. 327–328.

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Levert, C.: **Nieuwe records. De groteste intensiteit in een zeer zware regen.** [New records. Greatest intensity in a very heavy rain], p. 102–104.

Tetrode, P.: **Nebetrachting over twee verwachtingen met betrekking tot het buzondere jaar 1947,** [Review of two long range forecasts with regard to the exceptional year of 1947], p. 105–107.

Levert, C.: **Weeroverzicht April 1952,** [Weather summary for April 1952], p. 107–108.

van der Ham, C. J.: **Het weer in beeld op het televisiescherm,** [The weather depicted on the television screen], p. 110–111.

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Johnson, F. S., Purcell, J. D., Tousey, R. and Watanabe, K.: **Direct measurements of the vertical distribution of atmospheric ozone to 70 kilometers altitude,** p. 157–176.

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Wells, H. W.: **Ionospheric effects of solar eclipse at sunrise, September 1, 1951**, p. 291–304.
Parkinson, W. C.: **Note on the concentration of condensation nuclei over the Western Atlant** p. 314–315.

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Volume 1, Number 1, May 1942

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